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18/9/10 (Item 10 from file: 15)
DIALOG(R)File 15:ABI/INFORM(R)

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Here's the medium, what's the message?

Macleod, Marcia

Purchasing & Supply Management PP: 28-30 Dec 1994 ISSN: 0309-7242
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ABSTRACT: The barriers that have held up the growth of electronic data interchange (**EDI**) are slowly being overcome, making it easier for even smaller companies to take the **EDI** plunge. One of these barriers has been the investment in both money and time required to implement a successful system. But a number of companies set implementation of **EDI** against retaining business, and then it becomes cost-justifiable. The need to retain business by complying with requests from large customers to use **EDI** is sometimes as much a hindrance as a help. Help is at hand for those attracted to the concept of **EDI** , but either nervous of taking the first steps or at a loss where to begin. The **EDI** Association (EDIA) has been granted 87,000 ecus of EC money to extend its **EDI** awareness project for small and medium-sized enterprises being run with the Chambers of Commerce. Another initiative comes from the UN Committee for Trade and Development, which has backed the establishment of trade points worldwide. Other issues that have been addressed in an effort to progress **EDI** include security of electronic documents and standards.

TEXT: There are now approximately 1,000 companies using Electronic Data Interchange (**EDI**) in the UK--not many, considering the potentially revolutionary effect electronic trading can have on order processing, inventory management, business partnerships and that all-important bottom line.

But no one should dismiss **EDI** as a ash in the pan just yet: the barriers which have held up its growth are slowly being overcome, making it easier for even smaller companies to take the **EDI** plunge.

One of these barriers--perhaps the biggest--has been the investment in both money and time required to implement a successful system. It isn't cheap--but any company which has at least a 386 or 486 PC should be able to become ' **EDI** capable'--ie to send and receive messages--from around L5,000, plus usage charges. (These, however, are said to be less than the cost of physically printing and sending the same information.)

'If a potential user is looking at the costs of sending a few invoices a month against the start-up costs for **EDI** , it may think it's not worth it,' admits Gary Lynch, head of the **EDI** Association (EDIA). But, he adds, a number of small companies set implementation of **EDI** against retaining business--and then it becomes cost-justifiable.

The need to retain business by complying with 'requests' from large customers to use **EDI** is sometimes as much a hindrance as a help. Many smaller companies resent being forced into investing in something they don't see as particularly beneficial. But help is at hand for those attracted to the concept of **EDI** , but either nervous of taking the first steps or at a loss where to begin.

The EDIA has been granted 87,000 ecus (L66,000) of EC money to extend its

EDI awareness project for small and medium sized enterprises (SMEs) being run with the Chambers of Commerce. The initial project was launched with 100,000 ecus (L77,000) from TEDIS, the EC working party set up to further **EDI** and other technological developments, to establish 20 **EDI** Awareness Clubs. The clubs, five of which are up and running, benefit from a year's free membership of the EDIA, including a dedicated help line; an **EDI** library, including print, audio, video and disk material; an 'introduction to **EDI** ' seminar; and a users' forum in which established **EDI** users, new and potential users can meet to exchange experiences.
The second phase extends the number of clubs to 30. In addition, the EDIA will set up an SME accreditation and registration scheme to help give users a 'competitive edge'; develop modelling tools to provide guidance to SMEs on costs, benefits, etc; produce a directory of **EDI** software providers and other sources of industry help; and run implementation--as opposed to introductory--courses.

Another initiative comes from Unctad, the UN Committee for Trade and Development, which has backed the establishment of trade points worldwide. As delegates at the recent World **EDI** Congress were told, trade points are aimed at helping SMEs to facilitate international trade--including **EDI** --in an effort to reduce the US$800bn worth of non-tariff barriers to trade. The British trade point is at Sitpro in London.

Other issues which have been addressed in an effort to progress **EDI** include security of electronic documents and standards. Security has been looked at by all national and international bodies involved with **EDI** --the EDIA, the EC, the Edifact Board, etc. Model Interchange Agreements now exist, suggesting criteria and requirements to be included in a contract governing **EDI** usage between two trading partners; a set of Uniform Rules for **EDI** , currently being drafted by Uncitral, the UN Commission on International Trade Law, will be recommended to governments to provide an internationally harmonised approach to legal aspects of **EDI** ; and the idea of an **electronic notary** is being examined by relevant bodies within the EC.

The standards issue raised its ugly head again at the World Congress when delegates heard, first, that the EDIA in the US has gone bankrupt, and, second, that the Clinton initiative to get US government departments trading electronically was based on the US' Ansi X.12 standard, instead of the UN approved international standard, Edifact. The EDIA failure is said by some to be due to the conflict between the pro-Edifact American EDIA and Ansi X.12 Board.

However, most companies--outside the US, at least--which seriously want to use **EDI** internationally will use Edifact, even if they may use another standard for domestic trade. Certainly industry user groups are advocating the use of Edifact wherever possible. There are now 42 fully approved Edifact messages, 127 others in various stages, and six Edifact boards world-wide.

Edifice, the **EDI** user group for the electronics industry, is just one sup porting only Edifact. It has two message sub-groups--one for development, one for assessment--to help develop and test Edifact messages specific to the industry and not yet addressed by the Edifact Board. These include the Delfor, for blanket ordering, and Deljit for call-offs.

Edifice also has subgroups to deal with communications and technical issues, advising members on protocols and liaising with Vans, for example; business interests; and publicity and promotion. Other industry groups --albeit perhaps not quite as active--exist in many sectors. Rinet, for instance, is a Pan European user group for the insurance and reinsurance industry; EMEDI, or European Medical **EDI** , covers the health care sector; and Editex aims to promote **EDI** in the textile industry.

The freight industry, which lagged behind other sectors after initially pioneering **EDI** in the early '80s with Dish and Shipnet, is attempting to get the **EDI** ball rolling again with the cooperation of Ediship, the deep sea **EDI** user group, Asset for short-sea operators, Lotus, the EDIA transport group, and Edisc, the **EDI** shippers council. All are now migrating to the Edifact IFTM freight messages.

The spread of **EDI** among freight companies is paramount if 'international **EDI** '-- ie electronic trading between countries and continents--is to be effected. And without international **EDI** , many companies, especially those with overseas branches, subsidiaries or joint ventures, would not be able to benefit fully from electronic trading.

EDI is spreading world-wide--in countries as far afield as Taiwan, Malaysia, Chile, Argentina and Iceland. And while in most cases, **EDI** begins on a domestic basis, the new entrants, learning from the experience of others, are often targetting shipping and international trade as a prime candidate for the new technology.

In Malaysia, for example, one of the first **EDI** projects to actually get off the ground centres around Port Kelang. Begun in April this year, the Port Kelang Community System enables import and export declarations, duty payments, manifests and free zone declarations to be sent via **EDI** . It is envisaged that, eventually, PKCS will involve 22 Government agencies, 350 freight forwarders, 150 shipping agents, five hauliers and 12 banks.

A National **EDI** Project was begun in the early 1990s, and a Malaysian Edifact Committee and an **EDI** Implementation and Coordination Committee formed in 1992. The MEC coordinates and implements message standards, and has working groups to deal with Customs, transport, technical assessment, purchasing, finance and insurance and awareness and education. The EDIICC is setting up a single national **EDI** clearing centre to ensure a planned, harmonised implementation of **EDI** nationwide, and other industry groups are being set up for the finance community, veterinary services, and textile exporters.

Taiwan--which hosts the 1995 **EDI** World Congress--has several **EDI** projects on the go, with government support. Just under US$100m is being spent on a 10-year project to automate all commerce, and ensure all business, however small, uses including **EDI** . The automation of manufacturing processes is also being encouraged, as is financial **EDI** (a growth sector in Taiwan) and electronic Customs clearance.

'Taiwan has one of the more developed IT industries in the region', explains Fred Li, chairman of the Taiwan Vanguard Information Group and a director of the **EDI** World Institute, based in Montreal. 'But there are technical problems with the Chinese version of **EDI** . We are trying to solve this locally--especially as there is also a lot of interest in mainland China.' China already has a financial network, Gold, for banks.

Elsewhere in the Pacific, the Philippines has a World Bank grant to start an **EDI** service and a Canadian firm is launching a commercial **EDI** service; Thailand has invited GEIS to launch an **EDI** van, although there is not too much serious effort to get **EDI** off the ground; and Mauritius has begun Government-supported **EDI** activity.
Singapore, Hong Kong and Korea are already well documented: Singapore led the world in creating a national **EDI** network, and is now insisting that all ships which dock at the island send pre-arrival cargo advice to the port authority and Customs via **EDI** .

Australia is another world leader in **EDI** , setting up the **EDI** Council (Edica) in 1988. There are now 450 corporate members. An Electronic

Messaging Association (Emma) was established a year ago to focus on other forms of electronic trading. Ship ping was an early industry user of **EDI** with a national network called Tradegate which now sends 13M messages per annum between 2000 user sites ports, airports, agents, hauliers and shippers. It already links to South Korea's KTNet and Singapore's Tradenet, and wishes to link to all other world port/airport communities.

There is a number of working parties dealing with a range of other industries --Big (banking and trade finance), accounting, agribusiness, the automotive sector (80-90 per cent of parts are now ordered electronically), chemicals, construction, communications (i.e. Telecoms Australia), the federal government, HEMMP, which deals with heavy engineering, mining and minerals processing, and the DIY industry, which is now forming an **EDI** group.
The US, probably the first country in the world to use **EDI** , is, as mentioned earlier, going through a standards crisis. If Clinton can opt for Ansi X.12--even while recognising the importance to Government departments of trading electronically with their wide range of overseas suppliers--why should groups like the ISA, the US shipping **EDI** group, do any differently? Onlookers like Paul Lemme, a consultant helping the ISA and one of the early developers of the Ansi X.12 standard, believes, however, that the US will have to migrate to Edifact. There is', he says, 'no other standard'.

If the US is an extensive user of **EDI** , its northern neighbour, Canada, is not far behind. Many North American companies--Wal-Mart, Sears etc--cover both countries, so use **EDI** cross-border.

The Canadian **EDI** Council has more than 1,000 members and five offices; the federal Government encourages **EDI** --forcing Government suppliers to trade electronically--and **EDI** is also growing in the automotive, food, pharmaceutical and retail sectors. It is believed that there are over 6,000 active **EDI** users in Canada.

EDI is also alive and well in Latin America. Mexico, for instance, has a number of **EDI** initiatives in progress, spurred by the North American Free Trade Agreement, while Brazil and Argentina have retail companies and some banks--and, in the case of Argentina, a fanning group--using, or planning to use, **EDI** ; Columbia has worked on **EDI** for two years, but is held back by telecommunications problems.

Chile has made the most advances. A full digital telecom network, based on optical fibre networks, and a sophisticated bar coding system made the progression to **EDI** easier. The Government took a coordinated approach to **EDI** , insisting that the entire country used the same standards, protocols, and so on. Mining, which accounts for 42 per cent of exports, retail, banks, pensions (run by private companies), health care, transport and Customs are all using **EDI** . Seven banks set up a Van to concentrate on the sector, now trading electronically with England, South Africa and Germany; over 100 mining companies should be using **EDI** by early 1995; the first medical **EDI** message was sent in June; and Customs plans for a national **EDI** clearance system within two years. Government (tax collection, treasury, central bank) and construction will begin trading electronically next year.

Closer to home, continental Europe is catching up with the UK lead in **EDI** . Holland, Germany and Scandinavia are particularly strong. Denmark, for instance, saw the Copenhagen Telephone Company (KTAS) and IBM Denmark set up DanNet in 1987 as an **EDI** van, software supplier and consultancy. Major software houses have signed agreements with DanNet to gain **EDI** expertise and **EDI** capability for their products.

The **EDI** Council promotes the use of **EDI** , now taken up by the freight

sector via Translink, which gives an overview of all freight movements; Sony Nordic, for instance, cut its freight costs by 25 per cent through the use of **EDI** .

The retail sector, health care and plumbing, heating and ventilation are all strong **EDI** users; ironmongery is about to begin and the textile and clothing industry has also introduced **EDI** . Banking and insurance are also looking to trade electronically.

Smaller countries such as Iceland and Greece have also launched **EDI** initiatives--with the Greek Government giving half of 20M drachma funding to help 20 SMEs to start using **EDI** . Last May the EU provided funding for 100 small business users to start up an **EDI** system in a five year project.

Even Central and Eastern Europe are planning to embrace **EDI** --starting with Customs, which should eliminate Customs checks on virtually every shipment, through the EC Phare project.

If tiny countries with low GDP, a tradition of small business, and/or a recent history of communist rule and suppression of commercial entrepreneurialism can see the benefits and potential of **EDI** , surely those companies in established industrial countries, such as Britain, not yet trading electronically, can see the light.

COMPANY NAMES:
Electronic Data Interchange Association
GEOGRAPHIC NAMES: UK

DESCRIPTORS: **Electronic data interchange** ; Implementations; Manycountries; Barriers
CLASSIFICATION CODES: 5250 (CN=Telecommunications systems); 9180 (CN=International); 9175 (CN=Western Europe)
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18/9/12 (Item 2 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB

09410709 SUPPLIER NUMBER: 19261442 (THIS IS THE FULL TEXT)
Electronic notaries **can provide safe transmission. (The View from Inside) (Technology Information)(Column)**
Houser, Walter R.
Government Computer News, v16, n7, p34(1)
March 17, 1997
DOCUMENT TYPE: Column ISSN: 0738-4300 LANGUAGE: English
RECORD TYPE: Fulltext; Abstract
WORD COUNT: 811 LINE COUNT: 00068

ABSTRACT: The digital notary is one way of making electronic commerce transactions easy and secure. The technology works like the paper counterpart; the digital notary transmits an electronic document after checking the source's identification and attesting to its reliability by affixing a digital signature. A nominal fee could be charged by the digital notary for his electronic signature, while a higher fee could cover ensuring the message's integrity and possibly, encrypting it. The USPS is working on issuing public keys, which are the equivalent of a digital notary's electronic seal. Verisign, Netscape, First Virtual, Cybercash and CommerceNet, however, are developing similar technology that could beat USPS to market.

TEXT:

One of the major barriers to electronic commerce is the absence of widely available means of securing transactions.

Several methods exist for ensuring confidentiality of the information and authenticity of the partners. None has achieved widespread acceptance, in part because of the federal law enforcement and intelligence communities' stubborn advocacy of technologies unacceptable to most private firms.

Another problem is cost. Hardware-based solutions using key cards or smart cards may cost as little as $100. But most of us are content to write and mail checks and this tendency extends to large organizations such as federal agencies.

The occasional late fee or timely refund may inspire dreams of electronic transactions, but few of us would bother to dream further, even when paying taxes.

Keyboards, not pens

We need the means to make electronic commerce easy and trustworthy. The digital notary may do this, according to Ken Gilpatric, a Justice Department lawyer, working on the National Performance Review team.

Gilpatric describes the digital notary as similar to its paper counterpart. A customer brings an electronic document to the digital notary for transmission to another party. The notary checks the customer's identification, and if satisfied, uses his digital signature to transmit the document with a note attesting to the identity of the source.

Like his paper counterpart, the notary would not need to read the document but simply certify its source.

The digital notary would charge a nominal fee for his electronic signature authenticating the message. For a larger fee, he could assure the integrity of the message and nonrepudiation of its having been sent and received. For those requiring confidentiality, he could also encrypt the message.

Instead of getting a seal from the state, the digital notary could get his certificate from either a public or private certifying authority. The Postal Service has talked of issuing public keys, which is basically what a digital notary's electronic seal is.

But companies like Verisign Inc. of Mountain View, Calif., might beat

USPS to market, thanks to help they are getting from certifying Microsoft's Active X routines.

USPS' advantage is its tens of thousands of offices. But Verisign and Netscape Communications Corp. can recruit notaries electronically from the thousands of customers who have vouched for themselves with credit cards and other personal information.

Their training and deployment costs would be relative to those of the Postal Service. Their principal obstacle would be assuring themselves that their notary, John Doe, is who he says he is. The Postal Service can safely assume the veracity of its employees' identities.

Other potential competitors in the electronic commerce market are First Virtual Corp. of Santa Clara, Calif., Cybercash Inc. of Reston, Va., and CommerceNet of Palo Alto, Calif.

An enterprising digital notary may need to sign up with several certifying authorities because their solutions and methods may be incompatible, based on differing public/private-key algorithms.

One gets a secret private key and a public key to be widely distributed, like a telephone number. Text encoded with the public key can only be decoded with the private key. If I send you a message encoded with your public key, only your private key will decode it. If I encode a message with my private key and then send it to you, it can only be decoded with my public key, ensuring its authenticity as a message from me.

Many systems use faster single key algorithms and then hide that key by encrypting it with the recipient's public key.

Covert digits

If secrecy is not necessary, message integrity can be guaranteed by using a socalled hash algorithm. When I am ready to send, the message text is converted into a many-bit number using the hash algorithm, and that number is encoded with both my private key and the recipient's public key.

The slightest change in the message will result in a very different number when the hash algorithm is applied by the recipient. The number can only be decoded by the recipient's private key. The recipient knows the message is authentic--from only me--because only my public key will decode the hash number.

Software can deal with these complexities. Now that intelligence agencies and the FBI have backed off the Clipper chip and Fortezza card campaigns, vendors are coming to market with solutions--even if the administration won't let them export the products.

Let's hope the domestic market for digital notaries will be enough to get the concept started.

Walter R. Houser, who has more than two decades of experience in federal information management, is webmaster for a Cabinet agency. His own Web home page is at http://www.cpug.org/user/houser.

INDUSTRY CODES/NAMES: CMPT Computers and Office Automation; GOVT Government and Law; BUSN Any type of business
DESCRIPTORS: **Electronic commerce** --Safety and security measures
FILE SEGMENT: CD File 275
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18/9/14 (Item 1 from file: 20)
DIALOG(R)File 20:World Reporter

07926921 (THIS IS THE FULLTEXT)

Receipt.com Launches the First Digital Receipt Solution for B2B E-Commerce

PR NEWSWIRE
October 26, 1999
JOURNAL CODE: WPRW LANGUAGE: English RECORD TYPE: FULLTEXT
WORD COUNT: 391

XML-Based Digital Receipt Offers Irrevocable Proof of Online Transactions

MOUNTAIN VIEW, Calif., Oct. 26 /PRNewswire/ -- Receipt.com (formerly Differential Inc.) has launched the first-ever Digital Receipts for e-commerce transactions and messages. The XML-based solution issues highly secure **electronic notarized** receipts that give companies irrevocable proof that an online transaction has occurred.

Based on emerging XML standards, Receipt.com builds the infrastructure that helps businesses replace costly legal paper processes, limiting private networks, and inflexible **EDI** systems. Digital Receipt issues tamper-proof, **electronically notarized** receipts.

"Annual business-to-business e-commerce is predicted to grow from $45 billion to over $1 trillion by the year 2003. Electronic proof of transactions, document delivery and messages on the Internet will be critical for this growth to occur. Receipt.com is leading this revolution with our standards-based XML infrastructure services and software," said David Jevans, president and co-founder.

Digital Receipt provides legal substantiation for dispute resolution and regulatory compliance. Combined with Receipt.com's existing FileDrive and Extranet Creator product lines, Digital Receipt offers a complete solution for secure transactions and document delivery-proving beyond doubt that a digital transaction has transpired.

About Receipt.com

Receipt.com is a pioneer of trusted transactions and secure document delivery over the Internet for Global 2000 companies. Receipt.com services and software are based on XML digital signatures standards to create XML digital receipts for secure, provable, and reconcilable transactions -- a solution that is Safer Than Paper.

Receipt.com serves the banking and financial services, insurance, and business-to-business e-commerce industries. The company's customers include Aetna, Apple Computer, Blue Cross/Blue Shield, CNET, Dell Computer, DHL, Dun & Bradstreet, EDS, Gap, Inc., Hong Kong Telecom, The National Association of Securities Dealers, Netscape, and a number of leading U.S. and international commercial banks. The company has technology and marketing alliances with leading worldwide providers of security, hardware, software and e-commerce solutions, including Verisign, Entrust, RSA Security Dynamics, Compaq, IBM and the Sun-Netscape Alliance. Receipt.com is headquartered in Mountain View, California and is available on the World Wide Web at http://www.receipt.com.

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DESCRIPTORS: Company News; New Products & Services; Marketing
COUNTRY NAMES/CODES: United States of America (US)
REGIONS: Americas; North America; Pacific Rim
PROVINCE/STATE: California
SIC CODES/DESCRIPTIONS: 7375 (Information Retrieval Services); 5961 (Catalog & Mail Order Houses)
NAICS CODES/DESCRIPTIONS: 514191 (On-Line Information Services); 45411 (Electronic Shopping & Mail-Order Houses)
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8/9/18 (Item 18 from file: 15)
DIALOG(R)File 15:ABI/INFORM(R)

01502828 01-53816

Piecing the payments puzzle

Meshell, Gary

Banking Strategies v73n5 PP: 32-38 Sep/Oct 1997 CODEN: MBAAA5 ISSN: 1091-6385 JRNL CODE: BAD
DOC TYPE: Journal article LANGUAGE: English LENGTH: 5 Pages
WORD COUNT: 2228

ABSTRACT: Electronic commerce threatens the banking industry with extensive disintermediation. Already, nonbank technology companies are encroaching upon the 3 key functions banks play in payments: serving as primary intermediaries between customers and financial institutions and, more important, handling the data content of that interaction. Direct settlement of accounts could weaken banks' traditional role in cast management and disbursement programs. The strategic decision facing banks is whether to take an active role in this process, facilitating customer migrations from cash and checks to electronic media, or cling to the status quo, at the risk that nonbank entities will dominate the emerging electronic payments system. Banks should employ a 2-pronged strategy to assume leadership in electronic commerce and stay in the payments game. The first move is to participate in alliances, both with software and other nonbank financial services companies. The 2nd essential banking move is to combine resources and build an integrated back office.

TEXT: Illustration Omitted)

As nonbank technology companies muscle in on the payments system, banks must form their own alliances to maintain control of this critical and fast-evolving infrastructure.

In the not-too-distant future, people will be able to sit down at their home computers, open financial management software programs, and pay all household bills, online and in real time. But who will link households and vendors? If nonbank technology companies win the job, then banks will have lost control of their last competitive advantage - the payments system.

Electronic commerce threatens the banking industry with extensive disintermediation. Already, nonbank technology companies are encroaching upon the two key functions banks play in payments: serving as primary intermediaries between customers and financial institutions and, more importantly, handling the data content of that interaction.

For now, the emergence of a true mass market in home banking is hindered by the high cost of personal computers and the sluggish speed with which information travels on the Internet. But these constraints will fade. Economical diskless PCs and other so-called "Internet appliances" will deepen household penetration. Low-cost bandwidths in cable lines and the Integrated Services Digital Network will accelerate data transmission. Together, these factors will pave the way for a new era of electronic interaction between people and financial institutions.

At the same time, a fierce contest is looming over the information generated by the payments system. Direct settlement of accounts - by Microsoft Corp. and Intuit Inc., for example could weaken banks' traditional role in cash management and disbursement programs. The strategic decision facing banks is whether to take an active role in this process, facilitating customer migrations from cash and checks to

electronic media, or cling to the status quo, at the risk that nonbank entities will dominate the emerging electronic payment system.

Banks should employ a two-pronged strategy to assume leadership in electronic commerce and stay in the payments game. The first move is to participate in alliances, both with software and other nonbank financial services companies. The recent formation of Integrion Financial Network, an alliance between IBM Corp. and 16 major banks, shows what is possible. Designed to give consumers and merchants easier and more direct electronic links for settling accounts and managing their finances, Integrion has the potential to reach more than half the retail banking population in North America. This network eventually could supersede existing payment associations.

The second essential banking move is to combine resources and build an integrated back office, where all depositories can share in the intellectual capital that supports the payments system. Specifically, banks need to establish a robust database of billers, the millions of merchants accepting non-cash media such as checks and credit cards in exchange for goods and services. Driving a comprehensive fulfillment process, this database would facilitate transactions between any consumer and nearly any merchant.

Such a system is critical if banks are to reduce the cost of electronic services. Currently, banks must individually maintain merchant databases, an expensive practice that leaves them unable to connect all merchants with all consumers. Along with addressing these inefficiencies, a common biller database would boost processing speed and accuracy, driving down customer complaints from current high levels.
Implementing this two-pronged approach will be difficult. Consensus is crucial in making consortiums work. But banking's track record on joint projects is weak. Institutions often have a hard time transcending their own bureaucracies and parochialism. Even if banks do rally to a common cause, it is not yet clear how many consortium participants are needed to assure critical mass. And should such groupings include midsize regionals, or only the largest banks? Unencumbered by banking's regulatory constraints and plodding bureaucracies, meanwhile, technology companies such as Microsoft often launch new products more quickly.

New Competition

Still, the effort is well worth making, given the challenges ahead. The threat to the payments system, the very core of retail banking, is real and insufficiently appreciated by many bankers. No bank can afford to ignore advancing payments technologies that provide consumers with greater convenience and capabilities, both at the point of sale and in their homes. The development of the Internet, combined with advances in communications and the increasing use of home computers, is spawning innovations that promise to trim operating costs in the payments system and offer fresh competition to existing market players.
At present, banks largely control access to what is essentially a closed payments system, one of the most widely accepted but least applauded miracles of the late 20th century. Thanks to years of incredible commercial cooperation, money moves through a maze that's been likened to a complex electronic ecosystem. Customers, companies, banks and central banks are linked in an unbroken chain of inter-connectivity.

The future, however, promises to open multiple access points into this closed loop. Both the international Swift network and the New York Clearinghouse Association's Chips system are completely bank owned. But the Internet permits new financial intermediaries to offer lower cost entre to the payments system. In the future, suppliers of financial services will make money from customer information applications and access to customers, not from transactions themselves. In short, the present integrated system will disaggregate, with nonbank players taking key roles. Industry

economics will sharply change, with information management superseding transaction processing as a source of profitable revenues.

New competition is already emerging from retailers, manufacturers, telephone companies, cable television franchises and software suppliers. General Electric Co. is the world's largest supplier of electronic data interchange services and, as such, single-handedly exceeds all others in consumer electronic commerce.

A potent new threat has emerged with the collaboration between Microsoft and First Data Corp. MSFDC, as the alliance is called, will address many of the problems banks are attempting to fix on their own through the establishment of consortiums such as Integrion. When the lights go on at MSFDC, that organization will immediately provide a robust back office operation, a large biller database, and the technological capability to provide bill presentment as well as bill payment.

A key question is whether the new MSFDC alliance will remain bankfriendly or become the new non-bank competitor. Microsoft has consistently shown a strategy of striking partnerships with companies and learning from them, only to seize control of the business at a later stage. Banks must understand that Microsoft could ultimately become a financial intermediary as well as a provider of traditional bank content and services.

Banks face grave dangers when they allow external competitors such as Microsoft, Intuit and Checkfree to become payment system intermediaries. Whenever an electronic intermediary steps in, banks lose control of key customer information, such as the types of services consumers buy and which merchants they patronize. Since such transaction-based knowledge is the key to customer behavior, its retention is vital if banks want to boost their current share of revenues from retail accounts. Much of today's efforts at data mining and customer segmentation could be wasted if banks lose control of electronic intermediation.

Electronic Marketplace

Consumer preferences are evolving through three stages as electronic commerce moves from concept to reality. The first stage, which occurred in the first half of the decade, saw broad consumer acceptance of remote delivery via telephones and automated teller machines, channels that improved access and convenience.

Commencing in 1995 and likely to extend to about the Year 2000, stage two can be described as the early Internet era, when sizable segments of the population begin routinely accessing information online and using financial information software such as Microsoft Money and Quicken. The third stage, which will probably begin next year and continue into the next century, will bring value-adding services and more widespread usage of electronic commerce.

The convergence of telecommunications and computers will drive the need for payment mechanisms that can be used in a completely electronic setting. Electronic cash and smart cards, for example, will increasingly displace paper cash and checks. The proliferation of smart cards, combined with their ability to store information, will drive the growth of multi-functional single card payment flows. Bill paying will also play an important role in the growth of electronic banking. Currently the fastest growing type of consumer payment in the United States, this market is expected to expand by more than 54% a year, from $21.6 billion in 1995 to $189 billion by the year 2000, by our estimates.

Other factors driving the new era of electronic commerce are so-called trusted parties and strategic alliances. Trusted parties are exemplified by Verisign and CertCo, companies that link **buyers** and **sellers** and assume fiduciary risks by guaranteeing transactions they **verify** . The emergence

of trusted parties, especially in the area of software development and innovative technology applications, will accelerate the rate of migration to paper alternatives. Major strategic alliances between financial players, such as those involving MasterCard, Mondex, Integrion, Bankers Roundtable and MSFDC, will drive the transition to new payment flows, specifically through the new products they will provide to merchants and consumers.

The challenge for purveyors of financial services amidst all these changes is clear: survive on razor-thin margins and/or find ways to add value. The electronic marketplace for financial services gives consumers more choice, plus easier and faster access to their money. In addition to convenience, consumers want information and control. They also want banks to add value at a low price. The rewards will go to those financial service providers who best use the new media to accommodate changing customer behaviors and preferences.

To secure their share of this rapidly changing market, banks need to devise distinctive products and services, ones that consumers will not view as easily replicated commodities. Internet access allows consumers to hunt for the lowest priced deal of the day for credit cards, mortgages and other financial products. The way to make money is by building differentiated content and products that meet individual customer needs.

Admittedly, that is easier said than done. Web sites that attract media attention by their ability to offer a unique service - stock quotes, for example - soon become commonplace, their features replicated by dozens of competitors in a matter of months.

Need for Partners

The challenge for financial services companies is to create value propositions that not only garner desirable customers, but also enhance institutional brands. Local banks, faced with competition from category killers and national brands, are unlikely to accomplish much on their own. A better strategy by far is to focus on relationship management, while forming partnerships that can build an appropriate back office infrastructure.

The process of picking partners and forming an alliance is fraught with complications. Hardly a day passes without news of innovative incursions and fresh alliances in credit cards, application software and operating systems. Within months after Integrion's formation, for example, the Bankers Roundtable, a trade group of 125 leading U.S. banks, announced it was forming a technology secretariat. Through collaborative action, the group aims to forge a seamless electronic delivery and payments environment for its members. Visa and MasterCard each have developed electronic banking packages as well, although many banks are reluctant to join consortiums in which they might play second fiddle to more widely recognized brand names.

At the least, we can expect these new alliances to produce some surprising approaches: to software development for the Internet; and to back office operating systems, including bill payment, bill presentment, and the movement of electronic data through PCs, touch-tone telephones and screen phones.

Alliances, however, are not enough. Banks need also to create a common biller database and fulfillment process. Leveraging relationships with merchants --strengthening the common biller database - will become a critical component of payments strategy. A constructive cycle will emerge. The creation of industry standards will lead to uniformity in data transactions throughout the commercial system. Billers can expect to lower collection costs and solidify customer relationships, increasing their willingness to be listed in a common database. Adding more billers to the database will enhance operations and encourage more customers to pay their bills electronically. Through it all, participating banks can enhance relationships with merchants and customers.

In creating this central utility, banks likely will play a role similar to

the one they played in the early days of credit cards, when their objective was to encourage acceptance among merchants.

Whatever else they do, banks must avoid the mistakes they made in the early days of the Internet. Too many erred in narrowly viewing technology as a potential profit center, rather than as an enabler that would promote better customer relations. Rare will be the company that makes its money merely by jumping on the Internet or by offering PC banking.

Ultimately, all payments alliances may unite in a single consortium. If they do, this much is certain: at its center will be one, a common database, sufficiently robust to guarantee a streamlined biller setup; and two, a payment transaction processing system that enables banks to reach customers and satisfy their needs expeditiously before someone else does.

As the era of electronic commerce takes shape, the priority for banks of all sizes is to move before the new market overwhelms them. Players must use the next few years to their advantage, accepting that the Internet will become a dominant payments platform and seizing opportunities to test, probe and see what works in the expanding electronic realm.

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What's Hot in Technology

Scally, Deborah S.

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ABSTRACT: The Mortgage Bankers Association of America's (MBA) Technology Committee provides ongoing research in mortgage banking automation and communications systems. The committee is working on 3 major areas: 1. formation of an interagency liaison group, 2. electronic servicing transfers, and 3. standardization of mortgage industry documents to be used in electronic data interchange (**EDI**) technology. The recently formed MBA InterAgency Technology Liaison Group will periodically meet with representatives of Fannie Mae, Freddie Mac and GNMA to discuss the use of technology when setting or revising policies and procedures. The agencies need to be standardized, rather than competitive, in the areas of record gathering and data transmission. The Technology Committee is pursuing ways to link communications and standardize servicing transfer data. The committee works in the area of **EDI** has 2 purposes: 1. the standardization of data transmission for loan documents, and 2. the integration **EDI** capabilities within more sophisticated systems of artificial intelligence.

TEXT: Runaway refinance volume has been all the talk lately--and although many lenders are getting buried in an avalanche of paperwork, the truth is, things might have been much worse without the assistance of new technologies that have helped speed loan approvals and lightened the paper load.

Direct, instant on-line credit reports, sophisticated communications networks and laptop technology are just a few of the high-tech tools that have helped mortgage lenders provide efficient service to customers during the current refi boom.

But mortgage lenders don't have to look far to see that these are just some of the efficiencies that can be realized with up-and-coming developments. The Mortgage Bankers Association of America's (MBA) Technolgy Committee provides ongoing research into a myriad of mortgage banking automation and communications systems that promise even more effective use of current staff, faster processing times and more streamlined production. In some cases, these advances will pave the way for the use of expert systems in mortgage underwriting.
In October, Gregory A Samp, presient and chief operating officer of Sibley Mortgage Corporation, Rochester, New York, took over the helm as 1992 chairman of the MBA Technology Committee. Samp brings to the position more than 20 years' experience in many areas of mortgage lending. He currently oversees Sibley's loan administration, secondary marketing, management information and residential lending departments at the company's six branches. Sibley services a $1.7 billion portfolio, and originated just over $500 million annually. Last month, Mortgage Banking interviewed Samp and asked him to describe some of the hot issues on the Technology Committee's "front burner" this year.

Of the fifteen or so initiatives the committee is working on at this time, Samp identified three major areas that are at the forefront:

* the formation of an interagency liaison group; * electronic servicing transfers; * standardization of mortgage industry documents to be used in electronic data interchange **EDI**) technology.

INTERAGENCY LIAISON

Topping the list of major initiatives, according to Samp, is the recent formation of an MBA interAgency Technology Liaison Group that will periodically meet with representatives of Fannie Mae, Freddie Mac and GNMA to discuss the use of technology when setting or revising policies and procedures. By working together and sharing information, MBA hopes lenders and secondary market agencies can work toward goals that meet the needs of front-end and back-end operations. The formation of the interagency liaison group was mandated by a resolution passed last fall at MBA's convention in Dallas.

The initial meeting of the interagency liaison group was held in January, and high-level representatives of Fannie Mae, Freddie Mac and GNMA all attended. During this meeting, a consensus was reached that the group would continue to work together to pass uniform standards by which lenders interact with the agencies.

"The things (the agencies) do have an impact on everybody," says Samp, adding that "it is so important (for the agencies to) think 'standard' whenever it is possible to do so." Samp offers that this is especially important on the eve of possible government-sponsored enterprise (GSE) legislation that could require Fannie Mae and Freddie Mac to report Home Mortgage Disclosure Act (HMDA) data to HUD. To comply with such a reporting requirement, lenders would have to provide the data in a standard format so that Fannie Mae, Freddie Mac and GNMA would receive it uniformly.
But in some cases, Samp says, the push for uniformity hasn't been entirely accepted by the agencies. For instance, one agency might believe that its systems are better than the other such as Fannie Mae with Mornet, or Freddie Mac with Midanet. Samp says the interagency liaison group tries to overcome these ideological roadblocks when discussing straightforward processes such as record gathering and data transmittal. "It is important that the agencies be standardized, rather than competitive, in this area," says Samp.

In fact, Samp says, a uniform manner of data transmittal would benefit the secondary market agencies as well as the lender. In a hypothetical example, a standard data format that a lender would send to all agencies might contain eight pieces of information. If Fannie Mae required six pieces of data, and Freddie Mac required all eight, then the lender is safe because it sends all eight, uniformly, to both agencies. However, if Fannie Mae needed to change its requirements to seven, or perhaps all eight pieces of data, it would only have to modify its software interface to begin receiving the additional information immediately. Thus, Samp says, "If the changes are made in an organized way, this will let us (all) use technology to the fullest."

SMOOTHING OUT SERVICING TRANSFERS
The second hot issue on the Technology Committee's plate is servicing transfers. The buying and selling of servicing has exponentially increased in recent years, and along with these burgeoning servicing transactions comes the increasingly complicated question of how to go about physically transferring loan records from one shop to another. The Technology Committee is pursuing ways to link communications and standardize servicing transfer data.

When a package goes up for sale, potential buyers are often notified as to what kind of service bureau the seller uses, such as Lomas, CPI or Datalink, or what other kind of servicing system the seller may be using in-house. By doing so, buyers are advised that the information will be easier to retrieve if they already use the same system.

If circumstances are such that the buyer and seller aren't using the same service bureau or servicing system, several difficulties can arise. In a worst-case scenario, the buyer might have a system that is completely incompatible with the seller's, where loan documents would have to be re-keyed into the computer in a labor-and cost-intensive effort. Generally, however, things aren't that bad, and the seller can usually provide the buyer with a magnetic tape containing all of the information on each loan in the package. After that, a unique program is written for the buyer that translates the file specifications of the seller's system to those of the buyer's system. Though seemingly efficient, Samp explains, this method may also produce some obstacles.

First, he says, there is no way for the buyer to easily preview the package prior to the program being written, in order to see exact details on the types of loans involved in the transaction. Also, for each purchase from a different seller, the buyer must have a new translation program written, costing time and money. And finally, problems may occur within the translation itself--if a certain data field is not accounted for, or if it is not in the correct location, or if the coding does not translate correctly.

The Technology Committee, along with the MBA Loan Administration Committee, is working to develop one data standard so that a servicing package, once purchased, may be electronically transferred to a seller by means of a uniform system of coding. A work group currently studying this is made up of members representing many different types of companies, including servicing buyers, sellers, software vendors and servicing brokers.

Samp says that once the MBA standard is designed for the transmission of servicing packages, it will "open up the universe of loans that (buyers and sellers) can look at and (will help them) realize that collecting the information they need for the loans will not be a problem--and will not even be (a factor that they need) to consider."

The objective here is for loan-level information on servicing packages to be accessible--so the **buyer** and **seller** can **compare** the information about the loan mix electronically and eliminate problems with setting up the account. Samp emphasizes that eliminating concerns about how much work will be involved in the transfer would represent a big breakthrough.

"(The question of how much work is involved) should not be a controlling factor when making important business decisions about buying and selling (servicing rights)," he says.

EDI : TO X12 OR NOT X12

One of the most overwhelming advancements that will affect the future of mortgage banking is the standardization of mortgage document transmissions. The Technology Committee has formed several work groups comprised of mortgage systems vendors and mortgage lenders who want to establish which pieces of data must be standardized on each type of document in order for different companies to be able to "link up" the transmission of data electronically. This method is known as electronic data interchange (**EDI**), and in some cases, it is the first step necessary to build systems incorporating artificial intelligence (AI).

The committee's work within this area covers a broad spectrum of mortgage banking operations. For instance, standards for loan applications, credit reports. mortgage insurance applications, certifications of coverage, appraisals, title insurance and hazard insurance are just some of the types of documents that the committee has been reviewing. Separate work groups with members made up of mortgage bankers, vendors and suppliers look into each area of standardization and determine what infomation should be

included in the standard. Once a consensus is reached, MBA members are surveyed to determine whether they are generally favorable, neutral or nonfavorable toward the proposed standard. Based on the reaction from the mortgage banking community, the work group either moves forward to begin implementing the standard, or it reviews the nonfavorable feedback to try and improve the proposal.

In the arena of standardization, there is one organization that is looked upon as the authority--the American National Standards Institute (ANSI). As the preeminent expert on national standards of all types, ANSI has laid the groundwork as to what data should be included in certain types of transactions and documents. Thus, MBA has been working for several years with a group chartered by ANSI, called the X12 Committee, to develop standards for the mortgage industry. Data standards that meet the approval of the X12 Committee are respected because they have been stringently tested to meet universal needs.

This means, however, that there are many hoops to jump through before meeting X12's strictures. In an effort to get the mortgage industry up and running, Samp says the Technology Committee recently modified its position that the X12 approval was required before any standards can be approved by the committee.

"Our feeling," Samp explains, "was that with the strength of our industry now; with the amount of business that mortgage bankers are doing, that we were in a position of saying that if we can develop a standard that we like and that our vendors like, there's absolutely no reason, after coming to that agreement. to wait another four, six. twelve, maybe eighteen months to get the (X12) standardization approval. when we could be using (**EDI**) during all of that time."

Although Samp says the committee is "continuing our focus on the X12 approval" he says they are not going to use it as the "end all" or the necessary step before the committee can imply ment any of the initiatives involving **EDI** . "Although the X12 is a very positive thing because you have created a standard that is recognized by everyone," he says, "the drawback is that it crosses so many industry lines." This means, Samp continues, that "you can be bogged down in a transaction because there (might be) some other industry that wants modifications," One example, says Samp, is a hazard insurance form used in the mortgage industry. He notes that there are already transactions approved by X12 for insurance invoices and other ones for payments. But, he says, "there is some question about whether what we want to do, meshes with that."

Therefore, Samp explains, the Techology Committee is striving to come up with a standard that is a "mid-step," prior to X12 approval to "be able to use it as quickly as Possible."

THE SPRINGBOARD TO AL

Samp emphasizes that the work of his committee in the area of **EDI** has two purposes. One involves standardtion of data transmission for many types of loan documents--leading to faster processing, more efficient use of staff and increased productivity. A more pervasive goal for the industry, Samp says, and one which is a logical progression from the first application, is to integrate **EDI** capabilities within more sophisticated systems of artificial intelligence. A standard approved for credit reports, appraisal reports and the mortgage insurance application would be the linchpin for the committee to make inroads into AI.

"We want to have computers do the things they do best, and have people do things that they do best," Samp says. Once a company can receive a credit report electronically, the report would go directly to the specific address in the system and the computer would immediately compare the information to

the application. This would save having an employee read and compare every item in every report to the loan application.

In addition, aside from just electronically comparing the two reports for discrepancies. Samp describes how a computer could pick out and highlight certain items that might need the underwriter's attention, such as late payments or judgments. These and other capabilities are interim processes that will steer mortgage banking toward the most sophisticated level of automation: artificial intelligence expert systems that actually analyze loan information.

Samp says three types of documents are certain candidates for **EDI** links with A-: the mortgage insurance application, the credit report and the appraisal report. Although some larger companies have developed their own artificial intelligence systems, when **EDI** standards are approved for these three documents, AI applications won't be far behind for many more forward-thinking companies.

Currently, Samp says, most credit reports are sent to lenders in a hard-copy format. "Even if companies request credit bureau reports electronically, typically, they will receive an electronic report that must be printed out and the results must be keyed into the file," because there is no direct link to the lender's system. He says with a standard for transmission of credit reports in place, lenders would be able to receive the information directly into their own system. "We want to be able to request the report electronically and receive the information back electronically," he states.

Developing the credit report standards is a "high priority" for the committee this year, its chairman says, noting that the committee is slated to look closely at this issue at its next meeting during the Automation Conference in Chicago this month. He notes that this particular area of standardization could be implemented "fairly easily" and that it would be something that would positively affect many lenders' and insurers' businesses. Samp mentions three reasons that standardization of credit reports will likely be approved by the committee: they are required for every applicant; they must be carefully reviewed (which can be done by computer) and because the data is easily quantified. Also, he says that the large credit repositories are "very willing to move forward with this." Representatives of TRW and Equifax both serve on the committee's credit report work group.

Samp admits that for some smaller mortgage companies, it may not make sense to change the way they do business now, because they need to be ready to invest in full-scale automation hardware and software to benefit from the new data standards.

For some, however, the gains in speed and efficiency may just be the enticement they need to consider making automation a cost-effective business decision, Samp says.

Samp points out several advantages to using electronically transmitted apraisals. "If you look at the appraisal, and then look at the Fannie Mae or Freddie Mac's appraisal rule, you will see that it would be very easy to have your computer compare, electronically, the appraisal information to the rules." Further, one of the things an underwriter has to do is to look and see if all the adjustments add up. "Certainly a computer can do that a lot better than an individual," he says. Other information the computer could pick out of the appraisal are the geographic distance between the properties used as comps and the property backing the loan, the fact that average sales times are longer than desired, or the fact that comparables aren't, in fact, comparable at all. These are all things, Samp says, that can be flagged by an ordinary computer for an underwriter to examine, even before a company is ready to take the quantum leap into artificial intelligence systems.

INVOLVEMENT BY VENDORS

"Some of these initiatives, based on the number of transactions, may not be as beneficial to the smaller company," Samp says. However, he states, if a smaller company decides to begin using new technologies, "having a standard, as opposed to not having a standard, makes it more economical."

One example of this might be a smaller company that has four offices, each located in a different city. Each office might want to use the local appraisal company, but to do so, it would have to develop four systems, which would be difficult to justify. If there was the one system to do it, that would be a different story.
And, it's also true that smaller or medium-sized companies that have front-end automation already, use products supplied by vendors, therefore they will likely have a smoother transition into using the new Standards. The reason for this is because a very crucial aspect of the committee's push into standardization has been its goal to keep vendors involved in this whole process.

"Vendors have been key players in the individual work groups, Samp says, and notes, for example, that in the mortgage insurance application work group, approximately half the members of the group are vendors and, in general, the vendors have acted as leaders in these groups. "We're not looking at sneaking up on providers of service," says Samp. "We are working with them so that we have something that makes sense for us and them."

"What we want to see happen is that if a small or medium-sized company goes to, say, Interlinq, that the vendor would be able to say 'we have the standard interface in this system for you to do the mortgage insurance application, the tax service, the appraisal and the credit report, etc'....so that the cost would be almost nonexistent in their case.

Large companies who develop their own software systems have an advantage as well. Because they are already continually making modifications to their own systems, by using the industry standard, they only have to make one modification. Then they would be able to get credit reports from any credit bureau.

The real concept in **EDI** is that if you store the information electronically, there should not be any real difficulty in providing it to someone else, explains Samp. The object of the standardized transmission, therefore, is to provide the maximum amount of necessary information for companies to do business. "What (we're) saying is that if one person wants four pieces of information, and another wants five pieces of information off the credit report, and maybe another one wants three, and another, eight, that if we have one transaction that's identical, and it gives everybody eight pieces of information, then the one who wants five can pick out five and the one that wants three can pick out three, and so on."

MAKING STRIDES

And what has the committee approved so far? In December, the committee approved the standard for the transaction to request mortgage insurance. Samp said representatives from nine mortgage insurance (MI) companies were involved in the mortgage insurance standards work group--a likely reason for its approval. Another one, a tax service standard, recentiy hit a speed bump, according to Samp, because although a proposed standard was developed, a number of survey responses expressed dissatisfaction. Most were from service bureaus that did not wish to change their own standards with the tax service companies, such as Transamerica and Ticor. Samp indicated that the committee will take another look at this to try and make the MBA standards more like the ones already in use by the tax service bureaus.

Although a tape format standard was developed for hazard insurance, Samp says there is much interest in an **EDI** standard as well. "We want to be able to go from computer to computer," he says, explaining the benefit of **EDI** compared to sending tapes back and forth. However, he says, the hazard insurance format wasn't as high a priority as some of the other areas at this time.

"You have to be of substantial size and have a large number of transactions with individual insurance carriers to make this worthwhile (for the lender to use the standard.) It would be most beneficial to the company with (at least) 100,000 loans serviced that may have 500 to 600 payments that they are making every month to a State Farm or an Allstate Insurance, for example. It would be less helpful to the company with 20,000 or 30,000 loans that is only making 2 to 2,500 total insurance payments per month scattered to different (insurance) companies."

Although the committee has identified a title insurance standard initiative, like hazard insurance standards, this is not a high priority issue because it requires lenders to have a high volume of transactions to realize a real benefit from it.

HUB CLAIMS AUTOMATION

With foreclosures and delinquencies climbing, lenders are sensitive to the amount of time it takes to receive a payment from an FHA insurance claim. Thus, increased efficiency in HUb claims communications is another active area of pursuit for the Technology Committee. Eventually, data provided to HUD, as the balance, the interest paid-to-date, the escrow, the advances, the cost of foreclosure, the sale dates--all used to compute the amount of claim may he able to be reported electronically. This way, HUD's systems could review the information and either issue a check to the lender or identify errors more quickly.

LENDERS' VIEWS

With all this talk about systems of the future, how are lenders reacting to such lofty ideas and high-tech, ultramodern capabilities? With the refinance boom in full swing, when many lenders have enough volume to justify the investment as well as a real need to create efficiencies, their interest apears to be at high ebb.

Samp sees the present as a "perfect example" of a time when lenders are ready to listen to new ideas that will create efficiencies and higher productivity. In fact, lately, they've seen the results of automation really put to work "This January...we had a rush of business, which for most of us, exceeds the rush that we had in 1986-1987. Although things have slowed down a bit in the process, I think most lenders are doing better (this time) in handling this rush. And I think part of this comes from the fact that we are more tomated than we were before."

Interestingly, two things lenders seem most interested in these days aren't directly concerned with the committee's work with **EDI** . Barcoding and imaging are technologies that have hit their stride on their own. The interest in these technologies is high because the speed and efficiency of these two technologies is apparent. Both offer advances in cutting down on paper documents and speeding up document retrieval; both can be used within a companies' internal operations first, without having to worry about external applications.
But although the popularity and interest is high, many companies are still holding off making the plunge and actually investing in the systems themselves. The fact remains that while many companies have shown enthusiasm for barcoding, Samp says generally only large companies are using barcoding to any great extent these days. Part of the reason for that is because until MBA standardizes the barcode information, establishing

where certain information will be located and what data is necessary, we are not likely to see a widespread use of barcodes. Samp estimates that a reasonable timeframe for developing barcoding standards would be within three years.

Even without the standard, there have been many efforts made in the barcoding arena, Samp says. He notes that "all new documents are coming out with the bar code on them, such as the new (mortgage) application form and all of the new Fannie Mae documents. Samp reports that every company has been assigned a code by MBA, and that many of the forms themselves have been assigned codes.

MEANS TO MANY ENDS

Advances in technology are blanketing the universe of mortgage lending today. Once they are firmly entrenched in the mainstream of the business, these new, technologically advanced modes of operation will offer companies a better means of serving their suppliers and customers. Samp, however cautions us to remember an important fact in this rush toward automation: In many cases, the consumer still desires a face-to-face contact with a mortgage lending employee.

"What we have learned is that (customers) may appreciate what a computer can do, but (they) are more comfortable with a real person--that is who they want to deal with." In other words, the primary use for these technologies should be to fulfill needs between the lender and the suppliers, servicers and secondary marketers.

There is no single advance in technology that will completely change the operational landscape of mortgage lending today. There will, rather, be many small steps taken toward more productive and efficient companies and more satisfied consumers. Samp sums up the MBA Technology Committee's purpose this way: "Someone once said at an MBA conference that 'information is power.' Well, we all must, then, have a lot of power, because we all have a lot of information. But I think information is a lot more powerful if we fInd ways of exchanging it, in a way that makes the whole mortgage process more efficient."
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ABSTRACT: In order to use electronic data interchange (**EDI**) optimally, the current ways of working need to be redesigned. **EDI** can have an impact on all 3 determinants of organizational design: 1. product-market combinations, 2. structure, and 3. process. Focus is on redesigning business process, which is also called business re-engineering. The subject-matter for redesign is the boundary-crossing logistical processes in the value-adding partnerships of 2 organizations. The business redesigner needs, among other things, an understanding of the basic capabilities of **EDI** and of the concept of interorganizational coordination. There are 3 basic mechanisms for achieving coordination between 2 organizational units: 1. mutual adjustment, 2. standardization, and 3. shared variable. Coordination between organizational units is achieved by communication between them. **EDI** reduces the cost of coordination between organizations.

TEXT: The adoption of electronic data interchange (**EDI**) as a means of communication between organizations is growing rapidly, partly because of its alleged strategic potential, especially in the area of logistics. The premiss of the research encompassing this article, which ultimately aims at developing guidelines for redesign, is that in order to sustain lasting benefits from **EDI** the current ways of working need to be redesigned. This applies to the processes internal to an organization, as well as to processes between organizations. It is this latter area of redesign where **EDI** 's contribution is largest, and where real opportunities for redesign appear. The concept of coordination is identified as the core concept in the design of boundary-crossing logistical processes. A theoretical analysis of co-ordination is given, and the role which **EDI** can play is assessed. Important results from this analysis are the identification of types of information in logistical processes, a classification of messages, and a set of basic co-ordination mechanisms. Awareness of these will help designers to understand better their object of design, and ultimately to improve their designs.

ELECTRONIC DATA INTERCHANGE AND BUSINESS RE-ENGINEERING
We are now witnessing the prospective developments of systems broad enough to cut across company boundaries. Obviously, such systems can have a profound impact on the way business and commerce are conducted 1, p. 141!

As early as 1966 Felix Kaufman discussed the potential impact of "boundary-crossing data systems". Today the term "boundary-crossing data system" has been replaced by inter-organizational information system (IOS) and it is generally agreed that information systems, both intra-and inter-organizational, are becoming a prerequisite in modern business practice 2,3!. This is particularly true for electronic data interchange (**EDI**).

That **EDI** can have major efficiency implications is, today, a fact beyond discussion. However, the fact that **EDI** can yield competitive advantage is

merely illustrated by a few popular and successful case studies in the literature, which are not of much help to a manager studying the strategic possibilities of **EDI** for his or her firm. One fact which does result from the literature is that lasting benefits from **EDI** will not be sustained by its mere implementation (see 4! for a more general discussion of this issue). Instead, as **EDI** is increasingly becoming a commodity and available to all, in the long run lasting advantage can be achieved only by business redesign 5,6!.
Business redesign is a strategic process which can best be described by means of the adaptive cycle of Miles and Snow 7!, which is slightly adapted and presented in Figure 1. (Figure 1 omitted) This strategic decision-making process is a continuous organizational redesign process consisting of three phases: defining, engineering and structuring. In the defining phase the product-market combinations (PMCs) of the firm are determined 8!. The engineering phase deals with the design of those processes in the organization which assure that the defined product or service reaches the defined market, within certain performance constraints. These processes will be further called the operational processes of the organization. With structuring, the allocation of tasks and responsibilities to groups within the organization, and the design of systems to ensure effective communication and integration of effort 9! are meant.

EDI can have an impact on all three determinants of organizational design--PMC, structure and process--but here the focus is on redesigning business process, which is also called business re-engineering. In order to support the business redesigner a tool for simulating logistical processes, in which alternative designs can be evaluated with respect to their logistical performance, has been developed 10!. In the underlying modelling approach for logistical organizations, the systems approach has been applied and two aspect systems (which are subsets of the relationships between the elements in a system) are distinguished (see Figure 2): (Figure 2 omitted)

(1) the information aspect system (IAS);

(2) the goods aspect system (GAS).

Interrelations between the aspect systems are called steering signals (from the information aspect system to goods aspect system). In order to describe the dynamics of a logistical system, logistical processes are modelled as tasks coupled by precedence relations between those tasks. Tasks are either informational (located in the information aspect system) or physical (located in the goods aspect system). Examples of informational tasks are "accept order", "check inventory" and "send message", while examples of physical tasks are "pick order", "transport" and "assemble" 11!. What is interesting about this approach is that informational and physical tasks are modelled in an integrated fashion, making the dependences between information flows and goods flows visible.

The tool is merely supportive to the redesign process, a design which is the interaction between understanding and creativity. While creativity must reside with the designer, real opportunities for academic research exist in the understanding part of the process. One such opportunity is to provide the logistics redesigner with the necessary basic insight in order to assess redesign opportunities induced by **EDI** . Only part of all the insight needed to redesign logistics processes, namely insight into the co-ordination between organizations, is discussed in this article (see pp. 9-13). This is seen, however, as one of the design areas where **EDI** 's contribution can be the largest and of great practical relevance, as will be made clear in the next section. An understanding of what **EDI** really has to offer (the capabilities of **EDI**) is discussed in a later section (pp. 6-9). But first, some trends in logistics are discussed.

THE EMERGENCE OF VALUE-ADDING PARTNERSHIPS

There are several trends which make logistical management and logistical process redesign an area of increasing importance (see Figure 3). (Figure 3 omitted) Three of these trends--increasing customer service, shortening product life cycles, and increasingly turbulent business environments 12!--are viewed as the cause of two other trends which are discussed in more depth:

(1) increasing product variety; and
(2) back-to-core business.

The latter two trends are seen as the main factors related to the use of IT (information technology) in general and **EDI** in particular. Whether a causal relation exists between these trends and IT/ **EDI** is of no importance here. It is just observed that both these trends lead to an increased need for co-ordination and that IT and **EDI** reduce the "unit cost" of co-ordination 13,14! and thus enable these trends. This line of reasoning is presented in the schema (Figure 3).

INCREASED PRODUCT VARIETY

The shift from a seller's to a buyer's market has led, among other things, to increased customer service requirements, which have in part been responded to by product differentiation. The number of items, e.g. products, subassemblies, parts handled by an organization, has increased in order to meet individual customer needs. This variety in customer demand, and hence in the products offered, has led to increased complexity. There are two basic ways for dealing with this complexity of processes:

(1) reduce the complexity, e.g. modular product design, standardization of components; or
(2) manage the complexity.

BACK TO CORE BUSINESS

Companies are increasingly focusing on their core business and subcontracting parts of their business. Subcontracting is especially apparent not only in transport and physical distribution 15!, but also in supply. When subcontracting certain parts of their activities companies have to manage the interfaces to their subcontractors or service providers. Especially in cases where customer services and product quality are important, the management of the interfaces is of great importance. As a consequence many companies develop close relationships with their subcontractors to manage the product flows between them. This is a phenomenon which has been given many names, e.g. logistics alliances 16! and co-makership 15!. The term used here is value-adding partnership (VAP), defined by Johnston and Lawrence 17! as "a set of independent companies that work closely together to manage the flow of goods and services along the entire value-added chain". Logistical processes in value-adding partnerships are not confined to one organization, but are instead boundary crossing. The coordination of these boundary-crossing logistical processes is one of the main challenges with which a business redesigner is confronted.

CO-ORDINATION

Both variety and partnerships lead to increased effort in managing the boundary-crossing logistical process. This effort will be termed co-ordination, and the associated costs are called co-ordination costs. A boundary-crossing logistical process needs co-ordination between the partners, while in the case of a process with high complexity this co-ordination becomes more "voluminous". The importance of co-ordination is best described by Quinn et al. 18, p. 67!:

The capacity to command and co-ordinate services activities, supplier networks, and contract relations across the globe has become perhaps the most important strategic weapon and scale economy for many of today's most successful enterprises.

Having made the case for the importance of co-ordination, in the remainder of the article this concept will be analysed and the impact of **EDI** on co-ordination will be assessed. But first a closer look at **EDI** is taken in the next section and the scope of this article is further delineated.

UNDERSTANDING **EDI**

Before turning to the analysis of co-ordination between logistical organizations, a closer look at the vehicle for that co-ordination, i.e. communication by means of **EDI** , is taken. First a classification of IOSs is presented and the type of IOS of interest is indicated. With this demarcation in mind, some of the capabilities which **EDI** has to offer are presented, without claiming to be exhaustive.

INTERORGANIZATIONAL INFORMATION SYSTEMS AND **EDI**

The communication between organizations in a computer memory-to-memory fashion 19! is said to be carried out via an interorganization information system (IOS). Although several classifications of IOSs are available in the literature 5!, another one is developed here using criteria which enable the demarcation of the scope of this article.

In this classification the means of information transfer (**EDI** , data entry, file transfer) has no bearing on the resulting types. Just as in Benjamin et al. 5!, a distinction is made between "transactions" versus "no transaction" without, however, excluding the exchange of task support information in the "transaction types". Another criterion used is that of the relationship between the transacting parties, since the capabilities of the IOS are exploited differently depending on the duration of the relationship (contract). Finally, the existence of a third party is introduced to differentiate between pure markets and electronic brokerages. Notice that this third party, the broker, should not be confused with the "facilitator" of the IOS 3!, who operates and maintains the IOS infrastructure (even though both roles may be performed by one actor). The four types of IOSs are described next, and are summarized in Figure 4. (Figure 4 omitted)

Pure information provision. IOSs in which data are stored in a central database and made available to businesses belong to the first type of IOS. No business transactions are carried out via the IOS. Examples of these systems are Nielsen marketing data and Reuter's financial information. The usual means of communication in this type of IOS is remote database access, possibly followed by file transfer. No examples of the use of **EDI** as a means of communication in this type of IOS are known to the author. However, systems in which messages containing the information are directly processed by internal applications are conceivable, e.g. a weekly update message on sailing schedules of certain lines from an information provider to a forwarder, which on receipt automatically update the forwarder's internal database. The forwarder would need to have a "subscription" for this information.

Electronic markets. This type of IOS consists of a technical communication infrastructure and a business communication protocol. In case of order entry, the business communication protocol refers to the functionality for accessing the sellers' databases. In the case of **EDI** , which is the more practical choice of communication means here, the protocol refers to the set of standardized messages available for communication, and the scenarios for exchanging these messages. The existence of industrywide accepted standards for the messages and scenarios is a prerequisite for the viability of an electronic market system, since all combinations of buyer-seller pairs must be possible. Transactions are carried out

bilaterally, without a long-term relationship between the two organizations. The third party in an electronic market is a facilitator who merely provides the infrastructure, and possibly maintains the standards in the case of **EDI** , without interfering with the transactions carried out via the infrastructure.

Electronic brokerage. In an electronic brokerage type of IOS the transactions are carried out via an intermediate third party, the electronic broker. The function of the broker is to "collect" supply and demand and make this information available to clients-the buyers and sellers. Just as in the case of electronic markets, no long-term relationship exists between buyers and sellers. In the case of **EDI** as a means of communication, the message standard used could be determined by the broker since all transactions are conducted via this party.

Electronic hierarchy. In an electronic hierarchy the organizations involved have a long-term contract or partnership and their internal processes are aligned with one another through the IOS. The infrastructure used, be it a third party network or a leased line, is not of interest. If **EDI** is used as the means of communication (which is usually the case), parties could decide to use proprietary message standards. Depending on the degree of process alignment, they will often do so since standardization bodies cannot oversee all the (logistical) process intricacies about which two parties may wish to exchange messages.

These types of IOSs are illustrated in Figure 5. (Figure 5 omitted) This research focuses on electronic hierarchies in which **EDI** is used as the means of communication. The effect of using this type of IOS on the buyers' and sellers' processes which use the IOS is sometimes referred to as the electronic integration effect 13!, which means that virtual integration between separate organizations can be achieved without actual vertical integration. Electronic (virtual) integration of course only results after actively redesigning processes. The terms buyer and seller should be looked upon broadly, and represent in this research adjacent organizations in a logistical chain. The object "sold" can be a product as well as a service.

THE BOTTOM LINE: **EDI** 'S BASIC CAPABILITIES

In order to assess how **EDI** can improve business operations, understanding of the difference between **EDI** and other types of message exchange (e.g. postal, fax, telex) is needed. Then, given these intrinsic attributes of **EDI** , the capabilities of doing business differently from before as a result of these attributes are stated. The effects which may result when these capabilities are put to use (e.g. desintermediation, cost savings, reduced barriers to entry, workforce reduction, reduces lead times, etc.) are not discussed.

INTRINSIC ATTRIBUTES

The intrinsic attributes of **EDI** are the speed of message exchange and the ease of data capture with high reliability. These attributes can be achieved at relatively low cost when compared with other means of message exchange.

The speed of message exchange is only useful if the receiving application processes the message immediately after receipt. If messages are buffered to be processed, e.g. by the end of the week, this attribute of **EDI** is not used. With conventional unstructured message exchange every data element needs to be re-entered at the receiving end, resulting in high administrative cost. The ease of data capture alleviates this extra handling, and even stimulates the capture of more data into internal databases. Since information is only entered once at source, the possibility of re-keying errors is reduced to a minimum, improving communication reliability. Also it is possible to build in consistency

checks before a message is transmitted. A drawback is that an error at source will propagate through the entire chain. Logical checks performed by humans (e.g. "this customer never orders such large quantities") which are not built in explicitly will allow certain errors to go unnoticed. The cost of a transmission by **EDI** is usually lower than by conventional postal exchange. Together with the alleviation of the need for data entry personnel and the cost of errors made by these personnel, it can concluded that the cost of exchanging messages between applications is lower when using **EDI** (for recurring exchanges and substantial volumes).

These intrinsic attributes of **EDI** enable us to send more messages, more often, containing more data. "To more actors" can be added to this statement as a consequence of the increased connectivity, both technical and organizational. The question then arises: when is it useful to send what messages, containing what data, how often (the business communication protocol) and to whom? And how will this protocol improve (logistical) performance? These are redesign questions which are not answered here, but which require insight into the potential capabilities of **EDI** and the concept of co-ordination.

CAPABILITIES OF **EDI**

Based on the previously described intrinsic attributes of **EDI** , the literature and, in several cases, practical experience, the following capabilities have been identified. It is believed that focusing on these capabilities is an essential aid in designing the interface between organizations in a value-adding partnership.

Speed of message exchange means the speed at which a message is transmitted from the sending application to the receiving application. Notice that this attribute of **EDI** allows organizations to reduce lead times, but more importantly to control the underlying logistical process in a real-time manner. This real-time and interactive coordination capability of **EDI** is useful only for certain processes. It further imposes requirements on the processing speed of the receiving application.

EDI also allows the sender of information to hang on to the message as long as possible before the receiver actually needs it. Therefore the information exchanged will be more up to date. **EDI** hence improves the timeliness of information.

Another consequence of the speed of message exchange is that information which has been decoupled from a physical flow can be sent ahead to the point of destination, so that the receiver can anticipate the arrival of the physical flow (e.g. reserve handling capacity). Also the receiver can carry out certain tasks in advance, in parallel with the goods flow. Again, this sending of re-information is beneficial only for certain types of logistical processes and the crux is to find out for which processes what information can be decoupled and sent ahead.

A fourth consequence of **EDI** is called **comparison** shopping 20!. There are two categories of purchasing: strategic and spot 21!. In the case of spot purchasing the **buyer** **compares** the offerings of different **sellers** each time a purchase is made. **EDI** allows the **buyer** to increase the number of suppliers to be evaluated and subsequently select the one with the best offer. This reduction in search costs (buyers pay to obtain information on offerings in the market) has major strategic implications 22!.

The comparison shopping capability of **EDI** manifests itself only in electronic markets and electronic brokerages and is hence beyond the scope of this research, but it is very interesting indeed. The pre-information capability is irrespective of the organizational form, while using **EDI** in real time and interactively implies a close relationship between the organizations involved. The timeliness of information is of interest no matter what the interorganizational form is. When to put these capabilities

of **EDI** to use, and how to re-engineer the processes in order to sustain them, differs from situation to situation. In order to derive some generally applicable guidelines for re-engineering, a better understanding of boundary-crossing logistical processes and the resulting interorganizational co-ordination is required. In the next section the first step towards a theory of co-ordination in logistical processes is made.

ANALYSIS OF CO-ORDINATION

A closer look at the concept of co-ordination is presented. The cause for co-ordination is stated, a resulting classification of logistical information is derived, and its basic mechanisms are discussed. In the remainder of the article the term organizational unit (OU) will be used to indicate the object of analysis. An organizational unit can be one (legal) organization, but also a relatively independent part of an organization. The significance of this concept is that within an organizational unit operations can be controlled on the basis of authority or hierarchical control, while between organizational units co-ordination is needed.

THE CAUSE OF COORDINATION

As discussed in the section, "The Emergence of Value-adding Partnerships", the increased emphasis on coordination results from the increased variety in products and services and the increased outsourcing of activities. It is especially the latter trend which poses a fundamental problem if organizations wish to maintain or even improve performance of the overall process. The organizational units in a value-adding partnership can be modelled as interacting systems. Two systems interact either because they share some resources or because they are coupled by a flow 14!. In the case of logistical organizations which are adjacent steps in the value chain, the main source of the interaction is the coupling by goods flows and information flows. As the information flows are considered subservient to the goods flows, the focus is on the goods flows.

Coupling between logistics systems introduces a synchronization problem. This problem can be viewed from the organizational unit where the goods depart, as well as from the organizational unit where the goods arrive. In both cases the goods flow specification (i.e. all relevant attributes in order to process the goods) needs to be exchanged:

(1) The organizational unit must deliver at a certain time and place. The delivering organizational unit needs to know when and where the specified goods must be delivered early enough to make the following decisions:

* Capacity planning: planning the resources to produce and/or deliver the goods.

* Inventory management: planning the inventories so as to meet the specified time and place. Consider, for instance, a supplier delivering seats to a car manufacturer. The supplier wants to know when and where he must deliver certain goods as early as is required for managing his internal process.

(2) The organizational unit must handle an incoming goods flow at a certain time and place. The receiving organizational unit needs to know the time and place of delivery of goods for the following reasons:

* Capacity planning: reserving the resources for handling the incoming goods.

* Parallel processing: carrying out tasks in advance which will speed up the acceptance of the goods.

Consider, for instance, the delivery of a shipper's container to a

container terminal. The terminal operator needs information on this arrival, e.g. to staff the entrance gates which provide access to the terminal. Also a pre-arrival notice would enable some administrative handling to be carried out in advance, before the actual arrival of the container, resulting in a reduction of queuing time at the entrance gate of the terminal.

The synchronization problem could be resolved by introducing buffers of orders or of goods (inventory), while the inherent capacity problem could be resolved by introducing slack capacity. For example, goods entering a third-party warehouse can wait for storage (buffer) until personnel (capacity) become available. Or, when immediate storage is important because of the output rate of the goods, the warehouser can decide to have enough personnel available (slack) to cope with peaks in the incoming goods flow. Both these solutions either introduce extra lead time or extra costs, or a combination of both. As minimizing lead time and costs are general logistical objectives, the problems should be solved not by reducing the tightness of the coupling between systems by introducing slack, but by managing the coupling through co-ordination. Management of the coupling should be a joint effort of both parties, often resulting in benefits to both, e.g. a supplier who guarantees delivery time reliability has to closely manage the coupling (acquire accurate information on time and place of delivery, carefully plan and execute delivery), but can also rely on a preferred status with a manufacturer striving to reduce inventories. The tighter the coupling between systems, the more important information exchange attributes such as reliability, timeliness and frequency of exchange become. As was discussed in the previous section, these are precisely the areas in which **EDI** as a means of information exchange is superior to conventional means of exchange.

AN ANALYSIS OF CO-ORDINATION

In the following analysis of co-ordination, which focuses on the value-adding partnerships of two organizational units, the types of information needed to co-ordinate the boundary-crossing logistical process between the organizational units are derived. As was discussed in the first section, two aspect systems are of importance to logistics systems: the information aspect system (IAS) and the goods aspect system (GAS). The focal concept of the re-engineering perspective in this research is that the information aspect system is subservient to the goods aspect system. That is, the information aspect system should be designed such that the flow of goods is optimal, given certain performance constraints. The purpose of the information aspect system is twofold (see Figure 6): (Figure 6 omitted)

(1) to control the goods flow within the organizational unit; and

(2) to co-ordinate the goods flow between organizational units.

These are referred to as the control problem and the coordination problem, respectively. In the modelling approach briefly described in the first section, separate information task types are distinguished for dealing with co-ordination and control.

In order to understand better the type of information which is involved in the co-ordination between two organizational units a more formal look at the concept of co-ordination (based on 23,24!) is taken. As will be shown, the information needed in co-ordination follows from the analysis of the information needed for control.

ANALYSIS OF THE CONTROL PROBLEM

Consider for the moment a single, isolated organizational unit (see Figure 7), for which the output y that needs to be produced is given by its goal information, G. (Figure 7 omitted) Given this goal information the information aspect system will steer the physical process in the goods

aspect system p, by means of a steering signal ss. The information needed to make the steering decision is the status information S, and the information on the workings a model of the physical process, P. (The status information, S, and the "model" of the process, P, are jointly referred to as a process information.) The steering signal will be chosen such that some performance index, Q, is maximized. In practice this performance index and its norm will be translated to some control decision rule. A simple illustration of this control problem is given before the more complex co-ordination problem of two interacting organizational units is discussed.

Summarizing, the information needed by a single organizational unit for internal control is:

* goal information, G;

* status information, S;
* a model of the physical process, P; and

* a performance index plus norm, Q.

ILLUSTRATION OF THE CONTROL PROBLEM

A production organizational unit has a performance index, Q, with respect to its "product availability". In order to achieve the norm of 99 per cent product availability, high safety stocks are kept, reflected in the decision rule: "if inventory-level < 100 then replenish to 200". The producer has received an order to deliver 15 items of product-X. Hence the goal information, G, will among other things, state: "deliver 15 of product-X". After checking the status information, S, for the inventory level for product-X which is 105, the following two steering signals, ss, will be issued to the goods aspect system: "deliver 15 of product-X" and "produce 110 of product-X".

After delivery of the goods to the customer (output y = 15 of product-X), a status signal, s, "inventory level physically decreased with 15" will be sent to the information aspect system. After production of the items or replenishment of the inventory a status signal "inventory level increased with 110" will be issued. Since the control problem is confined to a single organizational unit, and **EDI** pertains to the exchange of information between organizational units, there is no immediate role for **EDI** in the (internal) control problem itself. Information exchanged between aspect systems, the signals, if carried out via electronic means, will be implemented as read/write accesses to a database (communication between databases within an organizational unit is not referred to as **EDI**). The indirect relation between **EDI** and the control problem is that, through improved coordination as a consequence of **EDI** , the solutions or results of the control problem will be more in accordance with what is desired, resulting in less need for internal corrections and internal feedback.

ANALYSIS OF THE CO-ORDINATION PROBLEM

Now consider two interacting organizational units (see Figure 8) which form a value-adding partnership. (Figure 8 omitted) Apart from the information needed in the control problem described above (G,S,P,Q), the information aspect system of each organizational unit needs to have some information on the interaction with the other organizational unit. This information is called coupling information, U. This coupling information can be information on:

* the "model" of the process in the other organizational unit, U sub p ;
* the status of the process in the other organizational unit, U sub s ;

* the goal of the other organizational unit, U sub g .

Depending on the co-ordination mechanism used (see below) a mix of this coupling information will be exchanged, and most likely not symmetrically, between the organizational units. The information on the process of the other organizational unit, U sub p , will be exchanged in the design phase of the value-adding partnership, and will be static, resident information. The coupling information components on goal and status (U sub g and U sub s) are more dynamic in nature and will be exchanged by messages (plans and status messages respectively; see next section for a message classification). Also agreed in the design phase should be a joint performance index, Q sub IR . (The subscript IR stands for "Interorganizational Relation".) Tasks pertaining to the exchange of this information, and the interpretation of the coupling information, are called co-ordination tasks. These coordination tasks also encompass the procedures and rules (derived from Q sub IR) agreed between the organizational units.

ILLUSTRATION OF THE CO-ORDINATION PROBLEM

Consider two organizational units, a manufacturer of cars and his supplier of car seats, who have solved the coordination of goods flow between them as follows. The manufacturer gives the supplier the following coupling information, U:

* the production schedule for car type A and car type B over a given period, U sub g ;

* the relevant part of the bill of material for the cars, U sub p :--car type A contains a.o.: two of seat X and one of seat Y;--car type B contains a.o.: one of seat Z and one of seat Y.

The manufacturer and his supplier have agreed on the procedure that the seats should be delivered in the exact amounts three hours before a car is scheduled for assembly, Q sub IR . In this illustration **EDI** plays an important role in the exchange of the coupling information. Especially for the volatile component U sub g , **EDI** may enable a higher frequency of exchange and hence a shorter planning period. But also the coupling information on the process model, U sub p , is very susceptible to exchange via **EDI** because of the need for accuracy and often also because of the need for rapid communication of its updates to the other party.

CO-ORDINATION MECHANISMS AND A CLASSIFICATION OF MESSAGES

There are three basic mechanisms for achieving coordination between two organizational units. These coordination mechanisms, which have been derived from Mintzberg's 25! and Galbraith's 26! intraorganizational co-ordination mechanisms, are:

* mutual adjustment;

* standardization;

* shared variable.

In the case of mutual adjustment the organizational units communicate until they have reached agreement on the characteristics of the goods flow (e.g. timing, volume). They do this for each flow or transaction over and over again. With the standardization mechanism the organizational units agree beforehand on the procedures and plan what will govern the goods flow. The shared variable mechanism is actually an extension of the standardization mechanism. The meaning of the shared variable, that is the actions coupled to different values of the variable, is laid down in procedures beforehand. A brief illustration of these mechanisms is given in Table I. In practice co-ordination almost always is a mixture of these basic mechanisms, and the way of co-ordinating is hence referred to as the co-ordination mix.

The direct supervision mechanism, in which a third separate organizational unit is responsible for the coordination between organizational units, is

beyond the scope of this research since the focus is on the value-adding partnerships of only two organizations.

Co-ordination between organizational units is achieved by communication between them. In formalized communication such as **EDI** , the unit of communication is called a message. The classification of messages given here is partly derived from the field of language philosophy 27,28!. A message is of one of the following types:

* Order. A message which directs the logistical process of the receiver (and which is laid down in the goal information).

* Report. A message reporting on an order received and carried out.

* Request. A message by which the sender requests the receiver to commit resources (e.g. time, space).

* Confirmation. A message sent in response to a request by which the sender commits himself.
* Plan. A message informing the receiving party of the sender's goal information.

* Status message. A message conveying status information of the sender's process to the receiver.

* Enquiry. A message by which the sender induces the receiver to send him certain information (e.g. request for quotation).

* Reply. A message containing information resulting from an enquiry sent (e.g. quotation).

In a value-adding partnership the order, report, status message and plan are the messages exchanged. The probing messages (request, enquiry) and their responses (confirmation, reply) are very unlikely to be used in a value-adding partnership, since agreements with respect to resources and information to be exchanged have been made in the design phase of the partnership, before its actual operation. In a value-adding partnership the order is exchanged to trigger off a logistical process, while the other three message types are needed to ensure that the process progresses as "smoothly" as possible, thus for the co-ordination of the goods flow.
The messages have to be defined (their content and purpose) along with the scenarios (rules) for their exchange. These together constitute the business communication protocol. Table II gives a framework which integrates the message classification (only the types which are used in a value-adding partnership), the information types derived in the previous subsection and the co-ordination mechanisms. (Table II omitted) Be aware that the coordination mechanisms are presented in their purest form. In practice co-ordination is a mix of these basic forms. The information types exchanged in the design phase of the value-adding partnership (Q sub IR and U sub p are not shown in Table II.

THE EFFECT OF **EDI** ON CO-ORDINATION

As explained in the schema of Figure 3, **EDI** (IT in general) reduces the cost of co-ordination between organizations. Apart from the set-up costs, these co-ordination costs are comprised of the costs of transmitting and of processing these messages. The latter are reduced because of the alleviation of manual intervention. For each of the basic co-ordination mechanisms the effect of using **EDI** is discussed.

In the mutual adjustment mechanism it now becomes feasible for organizations, instead of sending batches of orders, to send individual orders resulting in a higher exchange frequency. Also by sending an order as late as possible, the content of the order will be more up to date.

Consider for instance a manufacturer who performs the order acceptance task himself, but who has subcontracted the warehousing, order picking and delivery to a specialized warehouser. Customers use the telephone or fax to place their order with the producer. In the old situation, orders which were accepted on day one were batched and transmitted to the warehouse by file transfer at the end of day one. They were picked by the warehouser on day two and delivered to the customer on day three. With the use of **EDI** it became feasible for the producer to relay orders to the warehouser in real time, i.e. minutes after a customer order has been accepted, an order to deliver the goods is given to the warehouser. The warehouser immediately processes the order, produces a picking list, and picks the orders on the same day. Thus, due to **EDI** , a customer order placed on day one before 4 p.m. (allowing for time to pick the order at the warehouse) could be delivered to the customer on day two, achieving a reduction in lead time of 50 per cent.

There are two ways to implement the shared variable coordination mechanism: providing one party access to the other's database (shared database) or using a "linked" database 13!. It is the latter option in which **EDI** is used for linking and where **EDI** is in fact an enabling technology; for in the shared variable co-ordination mechanism it is essential that the coupling information on the variable shared is kept up to date. The advantage of **EDI** over a shared database is, among others, related to security aspects and matters of confidentiality, even in a partnership. Another important reason is that of technical independence, e.g. a service provider having partnerships with more than one party need not agree with all of them on the design of the shared database, a task which indeed would be impossible.

The standardization mechanism, in which a plan message is exchanged to govern the goods flow for a given period, is becoming an obsolete choice of co-ordination in an increasingly turbulent business environment, given the capabilities of **EDI** and its positive impact on the other mechanisms and the superior flexibility of these mechanisms. However, in cases where standardization suffices as a co-ordination mechanism, **EDI** would be a facilitating factor from a cost-effectiveness as well as from a reliability point of view, e.g. if the planning frequency could be increased.

CONCLUDING REMARKS

Given the capabilities of **EDI** when compared with other means of information exchange, it is no surprise that the availability of this technology renders current ways of working obsolete. Instead of using **EDI** for the automation of the current information flows between organizations, one should first question whether the current way of coordinating should be prolonged. Also, alternative designs of the physical characteristics of the underlying boundary-crossing logistical process should be incorporated in this analysis, since these alternatives may impose new requirements on the way of co-ordinating, requirements which can now be met by the use of **EDI** . Only after the co-ordination mix has been redesigned should organizations start addressing the more technical issues related to the implementation of **EDI** . Even though these issues should not be underestimated, they are clearly a secondary priority.

In this article value-adding partnerships have been identified as important interorganizational configurations which are largely enabled by **EDI** and where the coordination of boundary-crossing logistical processes is the key to good logistical performance. Even though the analysis has been carried out for value-adding partnerships consisting of only two organizations, it is assumed that the results can be extended to partnerships consisting of more than two organizations. Making this assumption plausible is one of the many opportunities for research in this relatively new area of operational interorganizational co-ordination and IT.
With insight into co-ordination across organizational boundaries, the basic

types of messages which can be exchanged via **EDI** , and the derived capabilities of **EDI** , it is now up to the business redesigner to apply his/her creativity and design to value-adding partnerships which can stand the turbulence of today's competitive business environment. Although it is realized that only part of the understanding required by the business redesigner has been presented, it is felt that some important steps have been taken in the right direction. The research of which this article forms a part goes one step further in assisting the redesigner by aiming to develop guidelines for redesign.

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TABLE I. ILLUSTRATION OF THE BASIC CO-ORDINATION MECHANISMS

MUTUAL ADJUSTMENT

B orders goods from A and they communicate until agreement is reached on, for example, the time of delivery and the packaging to be used.

STANDARDIZATION

A and B have agreed in advance that A will deliver 100 items of goods-X to B, every Friday morning on pallets, for the next six months.

SHARED VARIABLE

B has given A access to his inventory level (being the shared variable) and in addition they have agreed on the procedure that A will supply B with 100 items of goods-X on pallets as soon as the inventory drops below 40.

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DESCRIPTORS: **Electronic data interchange** ; Strategic planning; Logistics; Organizational structure; Trends; Coordination
CLASSIFICATION CODES: 2310 (CN=Planning); 5160 (CN=Transportation); 7400

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    (CN=Distribution); 5250 (CN=Telecommunications systems)
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? t s8/9/34

8/9/34 (Item 34 from file: 15)
DIALOG(R)File 15:ABI/INFORM(R)

01028090 96-77483
EDI : **An analysis of adoption, uses, benefits and barriers**
Arunachalam, Vairam
Journal of Systems Management v46n2 PP: 60-64 Mar/Apr 1995 CODEN: JSYMA9
ISSN: 0022-4839 JRNL CODE: JSM
DOC TYPE: Journal article LANGUAGE: English LENGTH: 5 Pages
SPECIAL FEATURE: Charts Diagrams References
WORD COUNT: 2707

ABSTRACT: Based on the establishment of trading partner relationships, electronic data interchange (**EDI**) systems have come to signify a speedy, efficient, and accurate means of electronically exchanging business transactions. To the extent that they are effectively integrated with existing information systems and resource management, **EDI** systems can also be a means of reengineering some critical business processes. The application of **EDI** involves the conversion of written documents into structured, machine-readable formats so that the computer in one company or functional unit within a company can receive and process data from another company's or unit's computer. In order to run **EDI** , components required include: 1. a body of **EDI** standards, 2. **EDI** software, 3. a capability to send and receive **EDI** transactions, a function often provided by value-added networks, or by 3rd-party networks or point-to-point configurations, and 4. hardware, including the appropriate peripherals such as a printer, modem, and storage devices. The potential benefits of **EDI** include a reduction in the time needed to exchange information.

TEXT: Electronic Data Interchange **EDI**)

has come to revolutionize in recent years the way in which businesses conduct their trading activities. Based on the establishment of trading partner relationships, **EDI** systems have come to signify a speedy, efficient, and accurate means of electronically exchanging business transactions. Ranging from the manner in which purchases are made to payments are remitted, they can contribute to reducing paperwork, decreasing human error, increasing accuracy, and improving productivity.

To the extent that they are effectively integrated with existing information systems and resource management, **EDI** systems can also be a means of reengineering some critical business processes and represent a strategic systems management philosophy rather than just a technical systems issue.

Notwithstanding the growing popularity and potential of **EDI** , there appears to be insufficient insight into **EDI** systems management, how **EDI** has worked for past adopters, and what aspects need more development before its value is better relayed to users. Further study of these aspects is needed.

With these objectives, this study reports on the results of an extensive survey of **EDI** users. Its purpose is to shed some light on **EDI** systems, with particular reference to adoption, benefits, uses, and barriers.

What is **EDI** ?

EDI is the electronic, computer-to-computer exchange of business information in a structured format between business trading partners or

between various units within an organization. Accordingly, **EDI** is a high-speed method of electronic communication that facilitates the exchange and processing of high volumes of business data from one computer to another. **EDI** is being used by many companies to order and pay for goods from suppliers, to arrange transportation with carriers, to receive orders from customers, to invoice customers, and to collect payments from customers.

The application of **EDI** involves the conversion of written documents into structured, machine-readable formats so that a computer in one company or functional unit within a company can receive and process data from another company's or unit's computer. These documents relate to business events such as purchasing, sales, inventory management, accounts receivable, and accounts payable. Therefore, these documents often contain information that will be processed by accounting systems.

Operation of **EDI**

In order to run **EDI** , typically five basic components are needed (Colberg, 1990): (1) a body of **EDI** standards such as those developed by the American National Standards Institute (ANSI); (2) **EDI** software to generate, receive, and interpret transactions with trading partners; (3) a capability to send and receive **EDI** transactions, a function often provided by value-added networks (VAN), or by third-party networks or point-to-point configurations; (4) enhancements to applications software required to accept or originate **EDI** transactions, and changes to traditional business procedures for strategic advantage; and, (5) hardware, including appropriate peripherals such as a printer, modem and storage devices.

As illustrated in Figure 1, the differences between traditional, paper-based systems (Panel A) and **EDI** systems (Panel B) can be significant. (All figure and tables omitted) The time delays (denoted by bent lines in Panel A) associated with each stage of a business transaction in paper-based systems do not present the same concerns in **EDI** systems (denoted by straight lines in Panel B).

For example, the time delays between order inquiry and inquiry response, placing a purchase order and receiving it, sending an invoice and receiving it, mailing a payment and receiving it, and updating accounts is reduced, if not eliminated, by means of electronic exchanges of underlying information in an **EDI** system.

Transmitting messages in **EDI** systems involves several stages. To illustrate a specific **EDI** communication, consider a purchasing/selling transaction between a buyer and seller. First, a buyer initiates the **EDI** transaction. The buyer's computer system translates, for example, a purchase order into the required **EDI** format (transaction set). During this phase, the buyer must also provide the system with information on the seller's name and identification number. Next, the buyer's system inserts identification information in front of the transaction set and control totals after the transaction set. Then, the **buyer** transmits the **EDI** envelope to the **seller** .
Once the **seller** receives this information, they **verify** the format of, and control totals in, the transaction set, ensuring that all information contained in the envelope was received clear, ungarbled, and intact. The seller then sends a functional acknowledgment to the buyer. The functional acknowledgment does not confirm that the seller intends to supply goods to the buyer, but that the information was received. At this time, the seller translates the transaction set into their own internal processing format and processes the transaction. When the buyer receives the goods, they send a receiving advice to the seller. The seller responds by sending a remittance advice to the buyer who pays the supplier with an electronic

fund transfer. At each stage of the process, when information is transferred, the receiver responds with a functional acknowledgment. An **EDI** system has potential advantages as well as disadvantages, as discussed in the next two sections.

Potential Merits of Using **EDI**

Time Needed to Exchange Information is Greatly Reduced

Paper-based systems are often inordinately slow. However, the time for mailing and processing (e.g., keying and rekeying order information) inherent in paper systems is eliminated with **EDI** . **EDI** messages can replace any paper document exchanged between two parties when completing a transaction. Moreover, the computer exchange of information is instantaneous.

Less Rekeying/Fewer errors

With **EDI** systems, personnel do not need to rekey information contained in paper documents into the paper system. Less rekeying translates into greater accuracy and faster response times. **EDI** also eliminates the need for personnel to reconcile purchase orders, receiving reports, remittance advices, bills of lading, etc. Thus, **EDI** can enhance the quality and consistency of transaction processing.

Reduced Personnel Costs

Paper-based systems are more labor intensive than **EDI** systems. In **EDI** systems, since paper documents can be replaced with electronic messages, clerical processing activities are greatly reduced. Therefore, labor can be used more efficiently and productively. Reducing clerical activities can also translate into a reduction in labor costs. In addition, since messages are sent electronically, **EDI** can streamline the order/delivery cycle, further reducing the mailing and ordering costs included in overhead.

Lower Inventory Levels

As paper-based systems are slow and order lead times are higher, companies without **EDI** systems may need to maintain higher inventory levels. In contrast, since companies using **EDI** systems can exchange information instantaneously, order lead times may be reduced. As a result, companies may not have to carry as much excess inventory to guard against stockouts, lowering inventory carrying costs. Fewer out-of-stock situations may also mean fewer lost sales and opportunity costs.

Complement Just-In-Time (JIT) Systems

Many companies are moving toward JIT systems. With paper-based systems, JIT would be difficult, if not impossible, to implement. However, with **EDI** , orders can be processed rapidly, allowing firms to significantly reduce inventory levels and to order materials as they are needed. Furthermore, the computer-to-computer communication with suppliers provides managerial personnel with the opportunity to scan the computers of suppliers and to look for the lowest bids and the highest quality.

Enhanced Materials, Inventory, Fixed Asset, and Cash Management

EDI , in conjunction with automated parts recognition and tracking systems, can provide managerial personnel with up-to-date inventory and raw material status reports from distributed locations. Production managers can plan production schedules more effectively, improving materials and inventory management. An advance shipment notice can be used to notify customers that the goods they requested are being delivered and can serve as a request for payment, triggering their accounts payable to send the amount owed. This way, firms can also have more accurate and timely information regarding cash receipts from customers and can manage their

cash balances more effectively. Thus, **EDI** systems can allow for the more efficient use of a company's resources.

Potential Demerits of Using **EDI** Cost

Cost

EDI systems can be expensive to implement. In some situations, companies may be required to purchase additional hardware as well as software to enhance communication links throughout the organization. Implementing **EDI** may also include hidden costs, such as additional training and education for employees In addition, many of the benefits of **EDI** may be difficult to quantify.

Customer/Supplier Attitudes

Customers or suppliers may not be willing or sophisticated enough to adopt **EDI** . Some companies may also find that the number of trading partners may be limited but that they are faced with the need to use **EDI** at the request of a few important customers.

Auditing/Control Issues

In addition to costs and customer/supplier acceptance, auditing/control issues can also present potential concerns. Because **EDI** uses electronic messages, there is no paper trail for auditors to examine. Although this situation does present problems for auditors, functional acknowledgments and control totals, in conjunction with proper authorization, access, and transmission controls, can alleviate some of these concerns.

Survey Findings

Despite the several purported merits of **EDI** , **EDI** use is still not as widespread as may be desired. Additionally, it is not clear how the advantages and disadvantages discussed earlier size up in reality. In order to assess this matter, and to gain further insight into **EDI** adoption, benefits, uses, and barriers, an extensive study was conducted.

A survey was mailed to approximately 900 registered **EDI** users. These users were selected from a confidential database provided to the author by Phillips Business Information, Inc., publisher of the 1994 **EDI** Yellow Pages. The surveys were addressed in each case to the Manager of the Information Systems department within the respondent organization. The survey contained 5 sections. The first section asked for several details regarding the organization's background (e.g., number of employees, annual revenues, etc.). The second section asked about the organization's perceived barriers to **EDI** adoption. The third section sought to ascertain the reasons for **EDI** adoption within the respondent organization. The fourth section elicited ratings of benefits actually obtained from **EDI** use, along with some information regarding customer/supplier use of **EDI** . The last section asked respondents about the extent to which the benefits from **EDI** had met their initial expectations. It also asked for **EDI** adoption information and satisfaction ratings on various aspects of the respondent organization's **EDI** system.

Respondent Profiles

A total of 180 responses was obtained. Approximately half of all respondents were from the manufacturing industry. Respondents were also from wholesale (21.11%) and retail trade (6.11%), as well as transportation, communications, electric, gas, and sanitary services (12.7%). The respondents were from a broad range of industries and organizations. The average (mean) number of employees in the responding organizations was 6,728. The average annual revenues were $40 million.

Organizations had an average of 2 outlets each.

Perceived Barriers to **EDI** Adoption

The most frequently cited barrier to **EDI** adoption was that of lack of awareness of **EDI** benefits. 37.9% of all respondents indicated that this was a barrier. Only 9.9% said that there were no barriers to **EDI** adoption. The frequency analysis of these factors is presented in Table 3.

Why **EDI** was Adopted

As shown in Table 4, a significant majority of respondents (127 citations or 79.4%) indicated that customer's request was instrumental in their **EDI** adoption. Additional written comments also indicated that **EDI** adoption was sometimes not entirely voluntary due to a firm "request" from the customer to the organization that they adopt **EDI** . This notion that some **EDI** users purchase **EDI** to keep their customers is understandable.

For example, Borthick (1992) notes that Ford Motor Company and Wal-Mart presented their suppliers with no significant choice but to purchase an **EDI** system if they wanted to continue to do business with them. However, being able to satisfy customers more efficiently is not a benefit to be overlooked, and **EDI** can facilitate this. A majority of respondents (51.3%) also cited the need to remain competitive as a reason for adopting **EDI** .

Rating of Benefits Realized from **EDI**

Ratings revealed that "Improved customer service" received the highest rating among the factors rated as benefits actually realized from **EDI** . On a scale of 1 (lowest) to 10 (highest), improved customer service received a mean rating of 7.71. The ratings are summarized in Table 5.

EDI Satisfaction Ratings

In order to explore **EDI** user satisfaction in more detail, respondents were also asked to rate several aspects of **EDI** use in terms of satisfaction obtained using a similar 10-point scale (see Table 6). Respondents appeared most satisfied with the support for major standards and quality of customer support.

EDI Adoption Information

A majority of responding organizations are fairly recent **EDI** adopters. 57.5% of them adopted **EDI** between 1990 and 1994. The remainder adopted **EDI** between 1985-89 (25.6%) or before 1985 (16.9%). A significant majority had not prepared a formal justification analysis before **EDI** adoption (71.9%) or after **EDI** adoption (83.8%).

The presence or absence of a justification analysis may neither be good nor bad, if adoption is made on the basis of perceived benefits alone. For example, Ferguson, Hill, and Hansen (1990) note that transaction cycle processing costs with **EDI** systems may be reduced to 1/10 or 1/20 the level of efficient paper-based processing systems -- and that potential cost savings and other benefits may amount in the billions of dollars.

For example, in 1986, General Motors announced a plan to go almost paperless in five years. A phased implementation of this plan began with a proposal to replace with paperless payments the approximately $4 billion per month in 400,000 paper checks to about 2,000 suppliers. The projected annual saving was $1.3 billion. Similar aspects of **EDI** have recently attracted interest in the business press, e.g., Wall Street Journal. Adoption statistics are summarized in Table 7.

Overall Assessment

The survey concluded with an overall question about the extent to which benefits from **EDI** had met initial expectations. The mean rating on a scale of 1 (lowest) to 11 (highest) was 5.61, indicative perhaps of the room for improvement in the design, implementation, and use of **EDI** systems. This need is reinforced by the fact that a very significant majority of the respondents (85.1%) answered yes to the question of whether they envisioned an expansion of **EDI** use in their organizations; only 9.4% answered no, while 5.5% were not sure. This overall assessment is presented in Table 8.

Conclusion

This study has explored contemporary business use of a new and important technology, **EDI** . Analysis of survey responses indicates that while significant developments have taken place in the adoption of **EDI** technology, the potential of **EDI** has not been fully realized. The establishment of mutually beneficial trading relationships and. customer service appear as clearly important considerations in **EDI** adoption, as do the need to reduce paperwork, improve accuracy, and remain competitive.

However, many organizations do not seem to rate benefits such as inventory control or cost reduction as highly as might be expected from a well-integrated system. A prominent barrier seems to be a lack of awareness of **EDI** benefits, compounded by some high setup costs and insufficient customer/supplier automation, training, and acceptance. The reporting features, quality of documentation, and user training available within **EDI** systems appear to be areas for further improvement.

The integration of **EDI** with existing systems and management decision support also appear to be areas warranting further examination. Given that about 85% of respondents envision an expanded use of **EDI** within their organizations in the future, these are important considerations for information systems managers.

The assistance provided by Phillips Business Information, Inc., In this project is gratefully acknowledged.

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Information Systems; Organizational Behavior and Human Decision Processes; CA Magazine; and Georgia Journal of Accounting.

GEOGRAPHIC NAMES: US

DESCRIPTORS: **Electronic data interchange** ; Advantages; Systems design; Polls & surveys; Statistical data
CLASSIFICATION CODES: 9190 (CN=United States); 5250 (CN=Telecommunications systems); 9140 (CN=Statistical data)
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? *t s18/9/21-22*

18/9/21 (Item 1 from file: 2)
DIALOG(R)File 2:INSPEC

6137985 INSPEC Abstract Number: C1999-02-6130S-066
Title: Electronic notary **system**
Author(s): Kuroiwa, H.
Author Affiliation: Electron. Commerce Bus. Promotion Div., NEC Corp., Japan
Journal: NEC Technical Journal vol.51, no.9 p.113-19
Publisher: NEC,
Publication Date: Sept. 1998 Country of Publication: Japan
CODEN: NECGEZ ISSN: 0285-4139
SICI: 0285-4139(199809)51:9L.113:ENS;1-H
Material Identity Number: H719-1998-012
Language: Japanese Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: Electronic commerce (EC) on the Internet is necessary in order to boost the growth of enterprises. In order to advance EC, it is very important to present a secure system for users and to adjust laws and institutions. Many studies have been made on those subjects at the government and civil levels. This paper describes an **electronic notary** (certification) system and introduces some examples. (6 Refs)
Descriptors: certification; **electronic commerce** ; Internet; security of data
Identifiers: **electronic notary** system; electronic certification system; **electronic commerce** ; enterprise growth; secure system; laws; institutions.; government; civil level
Class Codes: C6130S (Data security); C7210N (Information networks); C7120 (Financial computing); C7180 (Retailing and distribution computing); C6130E (Data interchange)

18/9/22 (Item 2 from file: 2)
DIALOG(R)File 2:INSPEC

6137973 INSPEC Abstract Number: C1999-02-7120-040
Title: EC and security
Author(s): Kimura, K.
Author Affiliation: Electron. Commerce Bus. Promotion Div., NEC Corp., Japan
Journal: NEC Technical Journal vol.51, no.9 p.38-46
Publisher: NEC,
Publication Date: Sept. 1998 Country of Publication: Japan
CODEN: NECGEZ ISSN: 0285-4139
SICI: 0285-4139(199809)51:9L.38:S;1-W
Material Identity Number: H719-1998-012
Language: Japanese Document Type: Journal Paper (JP)
Treatment: Practical (P)
Abstract: To achieve secure EC (electronic commerce), it is necessary not only to realize a technical infrastructure for security but also to promote regulations and worldwide political coordination for EC. This paper describes the security issues of EC, which are, "organization and policy", "electronic certification", " **electronic notary** ", "electronic money", "non-package distribution", and "EC solution framework". (0 Refs)
Descriptors: certification; **electronic commerce** ; security of data
Identifiers: electronic commerce security; technical infrastructure; worldwide political coordination; regulations; organization; policy; electronic certification; **electronic notary** ; electronic money;

? *ds*

Set	Items	Description
S1	152132	B2B OR (BUSINESS-TO-BUSINESS) OR (BUSINESS TO BUSINESS) OR ECOMMERCE OR ELECTRONIC COMMERCE OR EDI OR (ELECTRONIC DATA INTERCHANGE)
S2	5285836	COMPAR? OR VERIF? OR CHECKS NOT (CHECK? ACCOUNT?)
S3	5285836	COMPAR? OR VERIF? OR CHECKS
S4	5262679	S2 NOT CHECK? (1N) ACCOUNT?
S5	6808	(BUYER? OR PURCHASER?) (10N) S4 (10N) (SELLER? OR VENDOR?)
S6	366	S1 AND S5
S7	164	S6 AND PY<=1998
S8	114	RD (unique items)
S9	2472	(PUBLIC? (1W) CERTIFICAT?) OR (ELECTRONIC? (1W) NOTAR?)
S10	202	S1 AND S9
S11	149	S10 AND PY<=1998
S12	99	RD (unique items)
S13	60	S9 (20N) (BUYER? OR SELLER? OR PURCHASER? OR VENDOR?)
S14	47	S13 AND PY<=1998
S15	34	RD (unique items)
S16	543	(PUBLIC? (W) CERTIFICAT?) OR (ELECTRON? (W) NOTAR?)
S17	28	S1 AND S16
S18	23	RD (unique items)

?

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Set	Items	Description
S1	152132	B2B OR (BUSINESS-TO-BUSINESS) OR (BUSINESS TO BUSINESS) OR ECOMMERCE OR ELECTRONIC COMMERCE OR EDI OR (ELECTRONIC DATA INTERCHANGE)
S2	5285836	COMPAR? OR VERIF? OR CHECKS NOT (CHECK? ACCOUNT?)
S3	5285836	COMPAR? OR VERIF? OR CHECKS
S4	5262679	S2 NOT CHECK? (1N) ACCOUNT?
S5	6808	(BUYER? OR PURCHASER?) (10N) S4 (10N) (SELLER? OR VENDOR?)
S6	366	S1 AND S5
S7	164	S6 AND PY<=1998
S8	114	RD (unique items)
S9	2472	(PUBLIC? (1W) CERTIFICAT?) OR (ELECTRONIC? (1W) NOTAR?)
S10	202	S1 AND S9
S11	149	S10 AND PY<=1998
S12	99	RD (unique items)
S13	60	S9 (20N) (BUYER? OR SELLER? OR PURCHASER? OR VENDOR?)
S14	47	S13 AND PY<=1998
S15	34	RD (unique items)
S16	543	(PUBLIC? (W) CERTIFICAT?) OR (ELECTRON? (W) NOTAR?)
S17	28	S1 AND S16
S18	23	RD (unique items)

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WEST

Freeform Search

Database: All Databases (USPT + EPAB + JPAB + DWPI + TDBD)

Term: (public certificat$6) or (electron$6 notar$6)

Display 10 **Documents in Display Format:** CIT

Generate: ○ Hit List ◉ Hit Count ○ Image

Search | Clear | Help | Logout

Main Menu | Show S Numbers | Edit S Numbers

Search History

DB Name	Query	Hit Count	Set Name
ALL	(public certificat$6) or (electron$6 notar$6)	38	L1

=> d 3,14,15,19 pn

L7 ANSWER 3 OF 59 USPATFULL
PI US 6039248 20000321

L7 ANSWER 14 OF 59 USPATFULL
PI US 5936149 19990810

L7 ANSWER 15 OF 59 USPATFULL
PI US 5898156 19990427

L7 ANSWER 19 OF 59 USPATFULL
PI US 5822432 19981013

=> d hist full

(FILE 'HOME' ENTERED AT 17:30:09 ON 25 MAY 2000)

FILE 'USPATFULL' ENTERED AT 17:32:47 ON 25 MAY 2000
L1 943 SEA PLU=ON (DIGITAL? OR ELECTRON?) (5A) (NOTAR? OR CERTIF?
OR
VALIDAT?)
L2 306814 SEA PLU=ON NETWORK OR INTERNET OR WORLD(W)WIDE(W)WEB OR WEB
OR WEB(W)SITE? OR WEB(W)PAGE? OR ONLINE OR ON(W)LINE
L3 575 SEA PLU=ON L1 AND L2
D 1 HIT
L4 160 SEA PLU=ON L1 (P) L2
D
L4 1 HIT
D 2 HIT
L5 678 SEA PLU=ON (DIGITAL? OR ELECTRON? OR COMPUTER?) (2W) (NOTAR?
OR CERTIF? OR VALIDAT?)
L*** DEL 160 S L1 (P) L2
L*** DEL 5191 S 705/?/NCL
L*** DEL 61 S L6 AND L7
D L*** 1 HIT
D L*** 2 HIT
L6 127102 SEA PLU=ON PURCHAS? OR BUY? OR SELL? OR TRANSACTION
L*** DEL 231 S L5 (2P) L6
L*** DEL 111 S L2 (2P) L7
L7 59 SEA PLU=ON ((DIGITAL?/AB OR ELECTRON?/AB OR COMPUTER?/AB)
(2W) (NOTAR?/AB OR CERTIF?/AB OR VALIDAT?/AB))
D L7 1-59 HIT
D 3,14,15,19 PN

FILE HOME

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